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A Fable

ONCE upon a time a man named Tom visited the President of the United States. Tom was the country's biggest manufacturer of nails. There was a desperate housing shortage and a strong demand for nails. The price of nails had gone through the roof, something a good nail should never do.

Tom had made a lot of nails that year. He had sold none of them. His warehouses were bulging with nails, while the country—and indeed the whole world—was scrambling for the limited available supplies.

Tom's visit to the White House was news. It was assumed he had been summoned to be told that he must offer his mountain of kegs to a nail-hungry market. As he emerged, the scribes surrounded him.

"Did the President read the riot act to you?"

"Not at all. It was just a friendly visit."

"When will you sell your nails?"

"Whenever I can get a dollar a keg more for them than the present market."

Gratified by the tribute to his importance, Tom climbed into his cab and returned to the Carleton. His position was unassailable. He had the comfortable mental reservation that when the market moved up another dollar—he was sure it would—he might hold out for a still higher price.

The astonished scribes sought the President.

"Does not the scarcity of nails affect the public interest? Does it not retard construction and jeopardize the aid for Europe program?"

The President smiled.

"They are Tom's nails, are they not? If he wants to hold them for a dollar more, that is his business."

What is wrong with this fable? Nothing—as a fable. If we are talking about nails it is all fable, but very particularly that part where the President says the nails are Tom's and he can do with them whatever he pleases. Actually, no producer of nails can afford to accumulate and hold a year's output. In a period of acute shortage, he would not dare hold his nails for a higher price. Before his warehouses could bulge, the Attorney General would be in his hair and hundreds of self-appointed defenders of the public interest would screech denunciations. He would be marked as a horrible example of the acquisitive tycoon which only a capitalist society could produce.

Let's change the fable in only one detail. Instead of being a producer of nails, Tom is the biggest wheat farmer in the country. The fable now becomes a fact. Tom Campbell has 600,000 bushels of wheat. He did call on President Truman. He did say that he was holding his wheat for a higher price. There was a scarcity of wheat. ERP, it was claimed, was jeopardized by rising prices. The President did tell reporters the wheat was Tom's and he could hold it for a higher price if he wished.

Why should the whole character of this story be changed by simply converting grains of wheat into tenpenny nails? Why should Tom, the engrosser of wheat, be the respected intimate of the republic's Chief Executive, while the maker of nails, striving for the top of a tight market, becomes a public enemy?

The answer and the moral: He who has many pals at the polls can do no wrong.

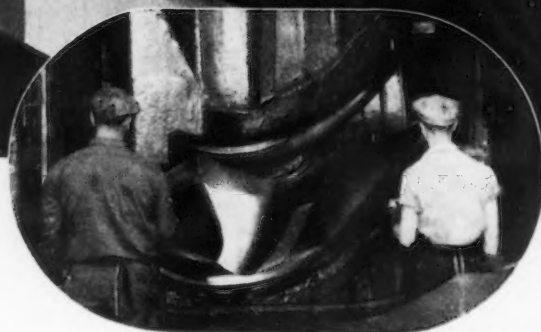
Joseph Stagg Lawrence

The "SHOTGUN".....

that helps give your car the NEW LOOK



(Above) Special machine for shot-blasting the rolls used in production of easy-to-draw Inland sheets, such as those being stamped into auto tops (right).



THE smooth-flowing lines of today's smart motor cars were made possible when Inland engineers developed the cold-rolled sheet *with the shot-blasted finish.*

This method of rolling steel with special shot-blasted rolls imparts a roughened surface to Inland sheets. The textured surface aids in the fabrication of deep-drawn parts, such as automobile tops and fenders. It holds the die lubri-

cant, allows better control of slippage, requires less hold-down pressure, and helps prevent scoring.

The shot-blasted roll is just one of many Inland developments providing industry with steel to fit the job. INLAND STEEL CO., 38 S. Dearborn St., Chicago. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.



...COLD-ROLLED SHEETS for Deep Drawing

OTHER PRODUCTS: BARS • STRUCTURALS • PLATES • STRIP • TIN PLATE • FLOOR PLATE • REINFORCING BARS • RAILS • TRACK ACCESSORIES

► A new type carbide turning tool used by an automobile manufacturer is making possible very substantial cost saving in automobile production. In one series of tests the new type tool is reported to have lasted 35 times as long before needing replacement as the tool previously used.

► Occupational authorities have announced that 1.4 million tons of Swedish iron ore has been sold to Germany for immediate delivery. This will relieve the heavy demands for scrap for the German industry, which has been charging as much as 80 pct scrap in openhearth. It may indirectly make more scrap available for export from Germany.

► The specter of spiraling inflation can not be blamed wholly on successive wage and price rises. The cumulative effect of gray market prices in steel (both domestic and export), coal, automobiles, etc., has loosed countless, phantom dollars tugging at the spiral.

► Trade sources indicate that fabricators of aluminum roofing have an eye on competition with cedar shingle makers more than with producers of asphalt or galvanized steel roofing materials. They evidence confidence that recent inroads into this market will become permanent, except in the southeast, where the low cost of galvanized sheet is expected to make it a lasting favorite.

► More pipe will be needed immediately now that the state of Connecticut has decreed that all hotels capable of housing over 50 people must have automatic sprinkler systems. Someone forgot to remember that they must also have pipe to install the systems.

► Policy of the Italian government is gradually, but definitely, in the direction of liquidation of government financing (Finsider) in Italian industry. Reason given for making the process a gradual one is to prevent unemployment resulting from government withdrawal.

► The changes in export license regulations have many would-be steel shippers stymied. The old wartime snafu prevails--you cannot get on a mill order book until you have a license, you cannot get a license until you have a firm order.

► The way one steel official sizes up the commodity debacle, it won't hurt the steel industry. Grain prices were too inflated, food took too big a part of the wage earner's dollar, leaving too small a part for other goods. Now more washers, refrigerators, etc., can be bought. Goods other than food may get a ride. Anyway it sounds good.

► Statisticians for the tire industry are forecasting a substantial drop in production during 1948. Most recent estimates place tire output during 1948 at 83 million casings compared with 100 million casings during 1947.

► Earthquakes pose an engineering problem at the steel mill now being designed for Fomento (Pacific Steel Co. of Chile). Furnaces will be equipped with flying buttresses and soaking pits will be specially reinforced. Coke oven units are to be smaller than usual, with special bracing to resist horizontal stresses--a technique also applied to Kaiser ovens at Fontana.

► A new magnetorque unit for controlling overhead cranes has been introduced by a midwestern firm. The unit consists of a simple rotor and a stationary field member through which braking forces are exerted electromagnetically. It makes possible with ac a smoothness of control and speed which heretofore could only be achieved with dc.

► Under the Polish-Russian trade agreement recently concluded, about one-third of the Russian loan to Poland is to be utilized for the erection of an iron and steel plant capable of producing 1.5 million tons of pig iron and 1 million tons of steel ingots per year. Erection of the plant which is to be situated near Gleiwitz, Upper Silesia, is to start early this spring.

► A Cleveland stamper supplying the auto industry reports that before the war he was using 1000 tons of steel per month, 90 pct of which was coming directly from mill sources. Today, with a requirement of 2000 tons per month, he is getting 5 pct of it from mill sources.

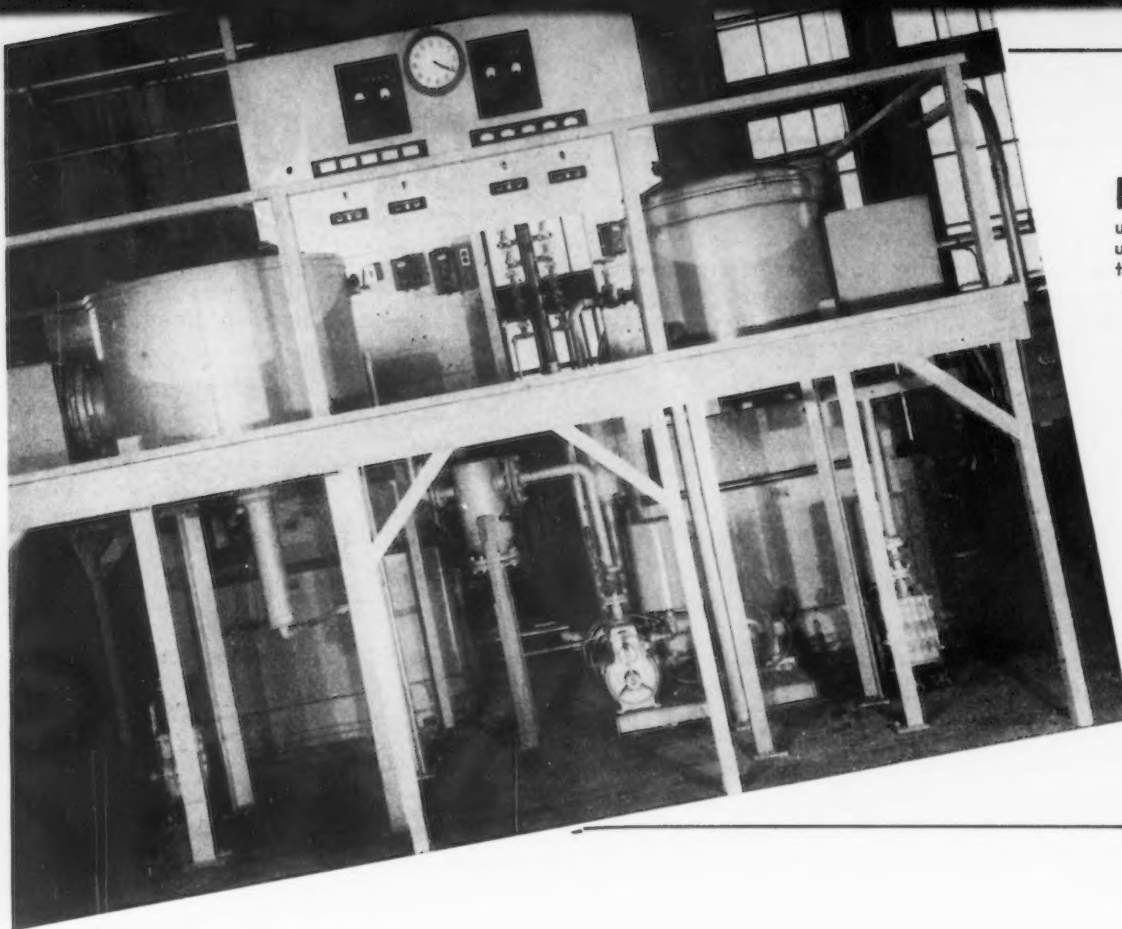


FIG. 1—An installation of two vacuum melting furnaces using internal induction coils and metal vacuum chambers.

Industrial Vacuum Melting

By KENNETH FOX, R. A. STAUFFER and W. O. DIPIETRO

Metals Research Dept., National Research Corp., Cambridge, Mass.

VACUUM is not new to metallurgy. For many years scientists have used various types of vacuum furnaces as laboratory tools in the study of properties of metals. These experiments have shown that vacuum melting removes gases and volatile impurities from metals to produce ingots of high density. Vacuumcast metal usually has increased ductility. Other properties are affected in specific instances.

The first attempt to commercialize vacuum melting was made during the years of World War I by the German firm Heraeus Vacuumsmelze, A-G. Laboratory vacuum equipment constructed from glass and quartz was abandoned, and melting furnaces were housed in metal tanks. At first, resistance windings were used to heat the

melting crucibles, but this design was subsequently abandoned in favor of induction heating. Vacuum induction furnaces with capacities as high as 5 tons were constructed.

At the time of World War II, Heraeus Vacuumsmelze was producing a large percentage of the nickel-chromium resistance alloys used in Europe. Other products included beryllium-copper, corrosion-resistant alloys and magnetic alloys. Smaller quantities of metal were supplied for such applications as thermocouples, surgical instruments, watch springs, and radio tubes.

At the time of the development of Heraeus Vacuumsmelze little was known about vacuum engineering, and equipment with high pumping

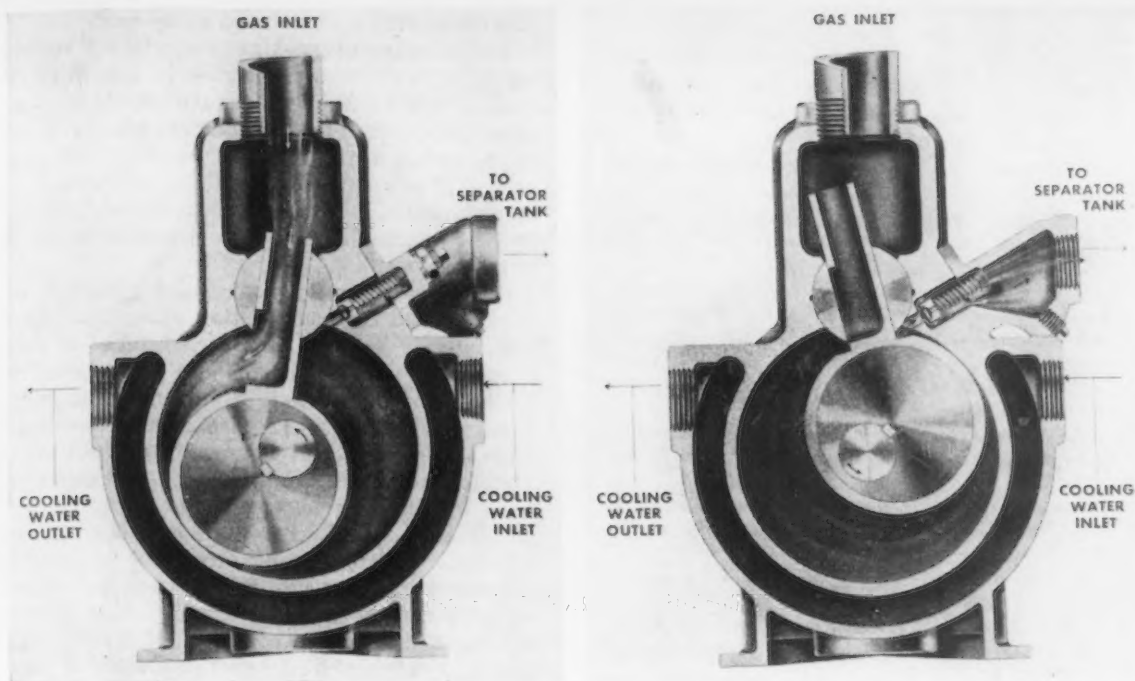


FIG. 2—Schematic diagram of mechanical vacuum pump at two stages of pumping cycle.

No longer a laboratory curiosity, vacuum melting is arousing increasing attention as an efficient, practical, commercial process for producing metals and alloys with characteristics not now obtainable with current melting practices. Since optimum results and economy of operation depend upon proper utilization of vacuum equipment, this article is intended to reveal some of the ramifications of construction and operation. In this, the first part of a two-part article, the authors describe various design features and indicate the influence of these factors on production, maintenance and measurement of vacuums ranging from 1 to 25 microns.

speed at low pressures was not available. The German furnaces operated at pressures in the range from 1 to 50 mm.

During World War II, however, many processes were evolved which required the use of pressures in the range from 0.001 to 0.1 mm Hg. Vacuum drying equipment^{1,2,3} was developed for the processing of penicillin and blood plasma, vacuum furnaces^{4,5} were developed for production of magnesium by the Pidgeon process⁶, and huge vacuum installations were required for the atomic energy program.⁷ The engineering data accumulated in connection with these processes has made possible the construction of commercial vacuum melting furnaces for operation in the high vacuum range.

A vacuum furnace consists of a gas-tight chamber with provision for manipulating a melt within the chamber, a pumping system to evacuate the chamber, and the necessary equipment for supplying heat to a charge of metal. The choice of a method of heating and of general furnace design must be based on a knowledge of the limitations of structural materials in vacuum applications. Fig. 1 shows two vacuum melting furnaces using internal induction coils and metal vacuum chambers.

A common notion exists that any vessel, no matter how leaky, may be evacuated to a low pressure if large enough pumps are provided. In a sense this is true, but the cost of maintaining a good vacuum in spite of large leaks is too

high for commercial consideration. In handling molten metal in vacuum, it should also be remembered that gaseous contamination can occur even at low pressures if the residual atmosphere is kept high in oxygen and nitrogen as a result of large inleakage of air.

The tightness of an evacuated chamber may

¹ L. V. Burton, "High Vacuum Technique Utilized for Drying Orange Juice," *Food Industries*, vol. 19, May 1947, p. 197.

² John R. Callahan, "Penicillin—Large-Scale Production by Deep Fermentation," *Chemical and Metallurgical Engineering*, April 1944.

³ Richard W. Porter, "Streptomycin Engineered into Commercial Production," *Chemical Engineering*, October 1946.

⁴ W. B. Humes, "Vacuum Engineering as Related to the Dolomite, Ferrosilicon Process," *Trans. AIME*, vol. 159, 1944.

⁵ Theodore R. Olive, "Introduction to High Vacuum in Chemical Industries," *Chemical and Metallurgical Engineering*, October and November, 1943.

⁶ L. M. Pidgeon, "Production of Magnesium," *Canadian Chemistry and Process Industries*, August 1939.

⁷ Robert B. Jacobs and Herbert Zuhr, "New Development in Vacuum Engineering," *Journ. of Applied Physics*, vol. 18, January 1947, p. 34.

be measured by closing the valves leading to the pumping system and noting the rate at which the pressure increases in the chamber as a result of inleakage of air. This value is known as the rate of leak for the system. For a given system the pumping speed necessary to maintain a given pressure against inleakage of air is proportional to the rate of leak of the system.

Assume that a tank with a volume of 50 cu ft must be maintained at 1 micron (0.001 mm Hg). If leakage in the tank is such that the rate of leak is 500 microns per min, a pumping speed of 25,000 cfm at 1 micron will be required. If the rate of leak can be lowered to 1 micron per min, only 50 cfm pumping capacity will be needed to offset leakage. The significance of this comparison may be realized when it is considered that the difference between the first and second cases can be a hole, in a tank, no greater than the size of a pin prick. The location and correction of such leaks is difficult and timeconsuming

enough to warrant all possible care during design and construction of vacuum equipment.

The selection of gas-tight material for vacuum retaining walls and the choice of a method for sealing joints and openings, are important parts of design. Only a few ceramics are dense enough to be vacuum tight; glass, quartz and some grades of sillimanite are suitable as vacuum retaining walls, but the limitations of size and fragility eliminate these from consideration on large size units.

Because of porosity and resulting leakage, use of cast metal for construction of vacuum chambers is undesirable. However, rolled steel sheet is satisfactory both from the standpoint of porosity and fabrication of vacuum-tight joints. When using steel sheet, permanent closures are made by arc welding. Removable connections to pumping manifolds, sight glasses and doors are made by drawing together two accurately machined standard flanges with a rubber gasket between. Before placing any piece of vacuum equipment into service, it is customary to check the performance under vacuum. This is very important in the case of furnaces in which the degree of internal heat brings up unusual problems of gas evolution and sometimes leads to confusion as to the cause of high pressure.

Tightness of the vacuum chamber is checked by determination of pumpdown time, ultimate pressure and rate of leak. The pumpdown time is simply the number of minutes required for the system to reach a given pressure. Ultimate pressure is the final pressure reached by the system after prolonged pumping. For a single system, rate of leak is usually referred to in terms of microns per minute. Two or more systems, regardless of volume difference, may be compared by referring to the product: *Rate of leak x Volume of system* (micron-cu ft per min). If it is found that a system is not performing as designed, leak hunting must be undertaken. For

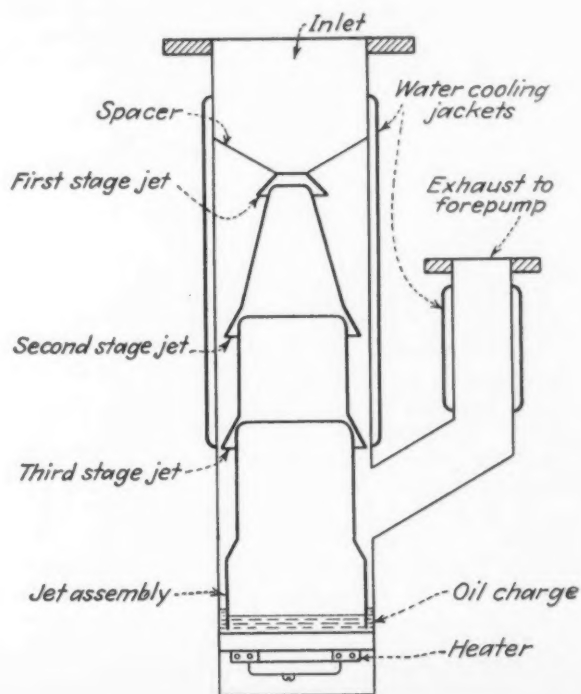
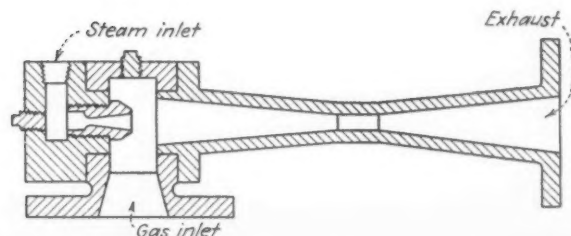
RIGHT

FIG. 4—Schematic diagram of diffusion pump.

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BELOW

FIG. 3—Schematic diagram of steam ejector.



RIGHT
FIG. 6—Curve comparing speed of various pumps as a function of pressure.

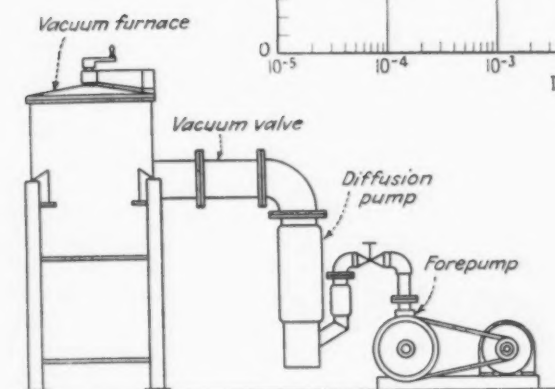
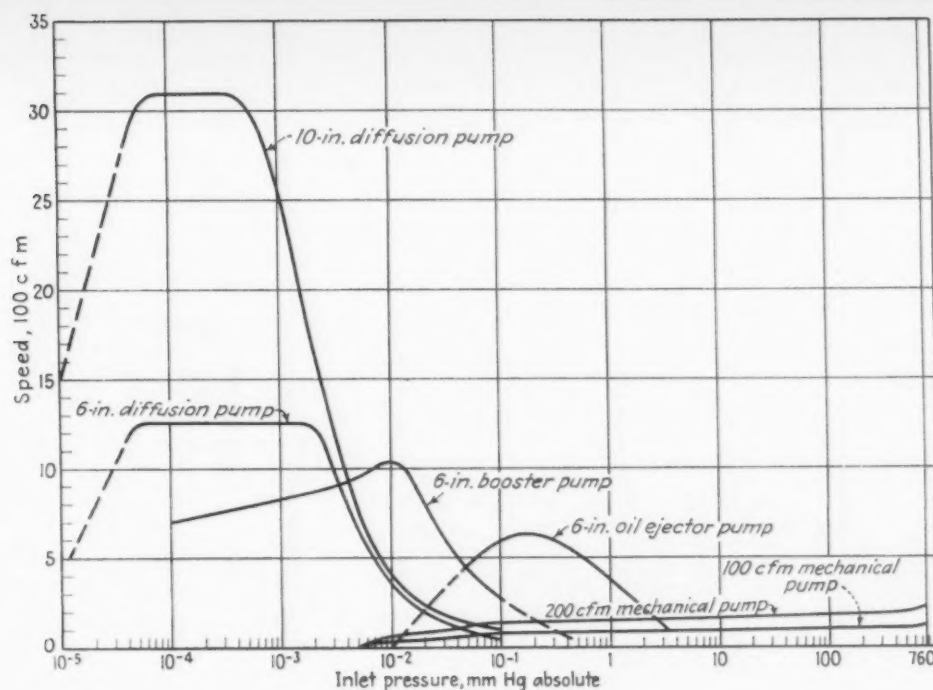


FIG. 5—Schematic diagram of typical pumping system.

large leaks that prohibit pressures below about 500 microns, internal air pressure and external application of soap solution are sufficient to determine the leaky place by bubble formation. When these major leaks have been corrected and pressures well below 1 mm Hg can be obtained, pressure gauges are used for leak hunting as will be described later.

Pumping Systems and Gages

For major vacuum applications three types of pumps are ordinarily used, either singly or in combination: (1) the rotary mechanical pump, (2) the steam or oil ejector, and (3) the diffusion pump.

The rotary mechanical pump, shown in fig. 2, makes use of a rotating off-center shaft in a cylinder, with spring-loaded radial plates entrapping the air and carrying it circumferentially to the exhaust, which is protected from back motion of the gases by an oil seal. Leakage of gas past the rotor, and gas picked up by the oil, limit the final pressure of this type of pump to about 5 microns. After constant use, large mechanical pumps will rarely reach less than 25 microns. Contamination of pump oil with water vapor tends to further decrease the speed, though con-

tinuous purifiers are available for removing and minimizing this difficulty. A typical speed curve for the mechanical pump demonstrates a very low pumping speed below 100 microns. Rotary mechanical pumps are available with free air speeds as high as 700 cfm. Mechanical pumps are not recommended when pressure below 0.1 mm must be maintained. The primary function of the rotary mechanical pump in high vacuum systems is as a "roughing pump" to take the pressure from atmospheric down to the operating range of diffusion pumps and as a "backing pump" to provide the low exhaust pressures necessary for the efficient operation of diffusion pumps.

Steam ejectors (fig. 3) operate by blasting steam through jets to entrap air molecules. Although specially designed ejectors may reach 20 microns final pressure, they are most economical when used in the millimeter range. When steam is available, ejectors operate more cheaply than mechanical pumps over a narrow pressure range. Steam ejectors are available with capacities high enough to handle 10 lb of air per hr at 100 microns.

Diffusion pumps (fig. 4) are almost always used when high pumping speed is required at low pressures. Free air pressures as low as 10^{-8} mm have been reported using this type of pump, although in the present stage of vacuum metallurgy, pressures of the order of 10^{-4} mm are considered low. Diffusion pumps operate by causing mercury or heat-stable oil to vaporize and stream through jets pointed away from the high vacuum inlet. The vapor stream entraps gas molecules which have diffused into the pump and compresses and exhausts them to a booster or mechanical pump. As this type of pump depends on diffusion of gas from the system being evacuated into the region of the jets, the pumping speed is roughly proportional to the cross-

sectional area of the inlet to the pump. For this reason diffusion pumps are commercially rated according to inlet diameter.

Adjusting the size and location of the jets, and adding ejector stages, permits variation of the pressure range over which maximum pumping speed is obtained. On this basis diffusion pumps are divided into two classes; high vacuum pumps with peak pumping speed at or below 1 micron Hg, and booster pumps with peak between 10 and 100 microns. Diffusion pumps are commercially available in sizes as large as 16 in. in diam with a maximum speed of 7000 cfm at 0.1 micron. For special purposes, units having speed as high as 20,000 cfm at 10^{-4} mm have been made.

A typical pumping system (fig. 5) consists of a combination of the pumps just described. A mechanical pump or a steam ejector is used as a roughing pump to bring the pressure down to several hundred microns, while a diffusion pump, backed by a mechanical pump or steam ejector, is used for final evacuation. Examination of a composite pumping speed diagram (fig. 6) will demonstrate the variation of pumping speed with pressure and the advantage of having a booster stage to maintain high speed throughout a pumpdown cycle.

When large quantities of water vapor must be pumped as a result of outgassing of furnace parts or metallurgical reactions in the furnace, it is advisable to provide a cold trap ahead of the pumping system. Such traps when operating above a micron use a mixture of dry ice and acetone to condense the water vapor evolved from the furnace. In large installations mechanical refrigeration may be desirable.

To operate properly, a well-designed chamber and pumping system must be connected by properly specified piping and manifolding. Comparison of vacuum piping problems with pressure piping often leads to ill-designed pipes. Large quantities of fluids can be sent through small pipe if high pressure pumps are used, but there is no analogy with vacuum systems because the most pressure that is ever built up to cause gas to flow in a vacuum system is one atmosphere, and this case is rarely approached. The *speed of pipes* is important in vacuum design. Each orifice, length of pipe, or pipe elbow has a maximum theoretical "pumping" speed, and this will not be exceeded no matter how large the pumps attached to it. Manifolding between tank and pumps must have a higher theoretical pumping speed than the pumps used, or pumping speed will be lost to the system.^{7,8}

The considerations set forth for the selection of manifolding apply for the choice of valves. Each valve has a characteristic speed, at low pressures, which should be kept as high as practical by the use of wide opening valves. Two types of vacuum-tight valves (fig. 7) are recommended; the bellows type, and the swing-disc type. In the bellows construction a flexible but vacuum-tight bellows is sealed to the shaft and housing to prevent gas leakage through the shaft entry. The swing-disc type makes use of pressure difference across the valve to hold it in the closed position.

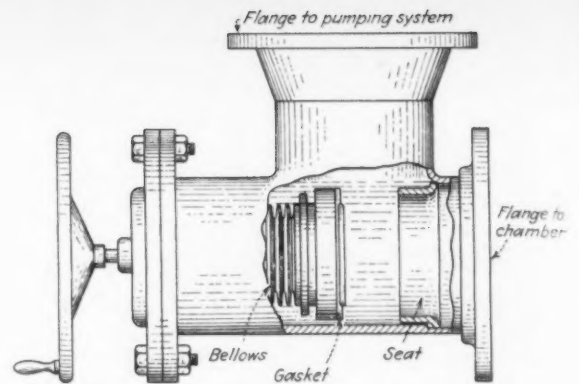


FIG. 7—Schematic diagram of vacuum valve construction.

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The "swing disc" is constructed so that it offers minimum impedance to gas flow when open.

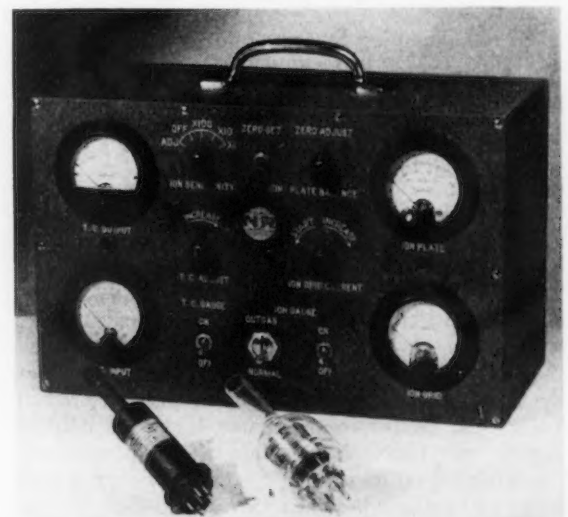
Valves may be operated automatically; and with the use of switches actuated by pressure gages, a pumping system may be made fully automatic, with diffusion pumps being cut in when the pressure permits and cut out when the pressure rises due to outgassing.

The simplest vacuum gage is the manometer. A U-shaped tube filled with mercury and connected to the vacuum system is calibrated to pressure difference between atmosphere and the evacuated system by noting the rise of mercury or oil in the vacuum leg of the U-tube. This common form of manometer is only accurate to about 1 or 2 mm and is thus inadequate for high vacuum systems. More elaborate oil manometers have been used for measuring pressures as low as 20 microns. However, in all designs direct view of the liquid column requires the use of glass tubing, and as a result the gage is fragile.

The McLeod gage can be designed to give accurate free air pressures in any narrow range of pressures between 10 and 10^{-5} mm. Fig. 8 shows

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FIG. 9—Illustration of a thermocouple gage.



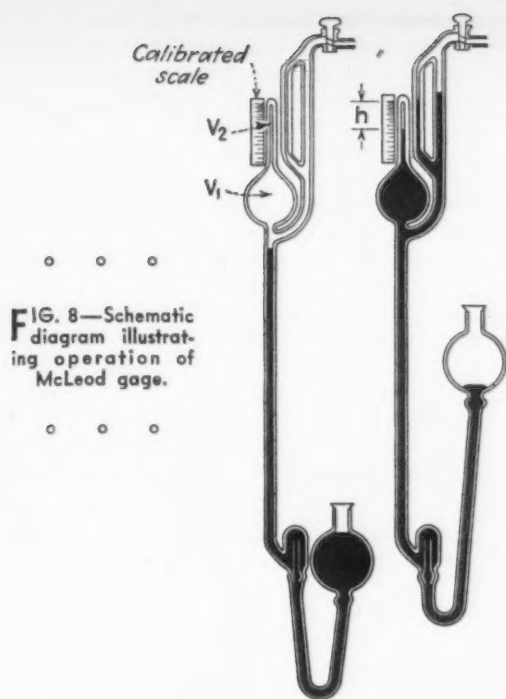


FIG. 8—Schematic diagram illustrating operation of McLeod gage.

a typical design and demonstrates the operation of the gage. The rising mercury column entraps a sample of gas from the vacuum system in a bulb (V_1) and compresses this gas into a small volume in the capillary (V_2). The mercury is raised to a given height, and pressure is read by measuring the difference in height of the two mercury columns (h). The range covered by the gage is determined by the ratio of the sizes of the bulb (V_1) and the capillary (V_2). Each gage must be individually calibrated. The major disadvantages of the McLeod gage are its fragility, inability to read presence of condensable vapors, and the fact that only intermittent readings may be taken, and these must be carried out manually. The gage is an excellent primary

standard, but in a vacuum furnace with much pressure fluctuation expected it is desirable to have a constant and direct reading gage with fairly rapid response.

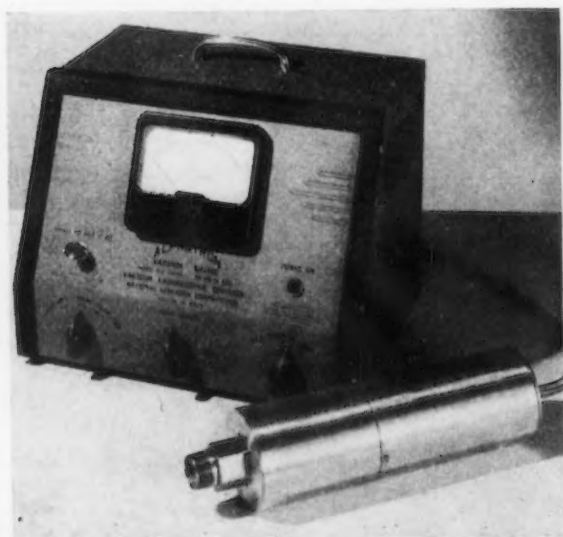
Primary standards, gages in which calibration may be made by reference to physical dimensions, include the manometer, McLeod, and Knudsen gages. The Knudsen gage measures the impact of gas molecules on a light vane by recording angular deflection. All other types of gages depend on some property of gases for operation. One group uses the thermal conductivity of the residual gas and another the degree of ionization that may be produced in the residual gas.

The thermocouple gage and the Pirani gage measure pressure as a function of thermal conductivity of the residual gas. The Pirani type consists of a filament heated by current at a constant voltage. The temperature varies as a function of thermal conductivity of the surrounding atmosphere, and this variation is noted by the change of resistivity of the filament. Commercially available Pirani gages cover the range of pressures from 0.1 micron to 750 microns, giving a continuous reading throughout the range. The thermocouple gage supplies a constant current to a filament and records the temperature variation by a thermocouple connected to the filament. A micrometer calibrated in microns of mercury reads pressure as a function of thermocouple output.

The "TC" gage (fig. 9) is a rugged instrument designed for use on industrial vacuum equipment and can be threaded into a standard $\frac{1}{8}$ -in. pipe fitting. Standard models indicate pressures in the range 1 to 1000 microns. Both the Pirani and thermocouple gages depend for their readings on the change of temperature in a metal wire, and speed of response is dependent on the specific heat and size of the wire.

Ionization-type gages operate by ionizing the residual atmosphere contained within it and measuring the electrical current which can be carried by these ions. The resulting currents are directly proportional to the pressure in the

FIG. 10.—Illustration of Alphatron vacuum gage.



⁹ Gordon P. Brown, Albert DiNardo, George K. Cheng, and T. K. Sherwood, "The Flow of Gases in Pipes at Low Pressures," *Journ. of Applied Physics*, vol. 17, No. 10, October 1946, p. 802.

¹⁰ J. R. Downing and Glenn L. Mellen, "A Sensitive Vacuum Gage with Linear Response," *Rev. of Sci. Inst.*, vol. 17, No. 6, June 1946, p. 218.

¹¹ Glenn L. Mellen, "Radium-Type Vacuum Gage," *Electronics*, April 1946.

system. The gage must be adjusted frequently in making readings, but response is continuous and rapid. The gage depends for its operation on a filament which causes ionization. This filament is kept at high temperature during operation, and if the pressure in the system exceeds a few microns while the gage is in operation, the filament will be destroyed by oxidation. For this reason the upper limit of the ionization gage is set at about 1 micron, but the gage gives accurate readings at pressures as low as 0.001 microns.

The most recent development in vacuum gages is the so-called "Alphatron"^{9,10} (fig. 10). This

gage operates on the same principle as the ionization gage, but instead of using a hot filament as a source of electrons to cause ionization, a small radioactive source emitting alpha particles causes ionization. The gage has all the advantages of the ionization gage, that is, rapid response, linear scale, and constant reading, without the disadvantage of a filament which will burn out if exposed to high pressures or become contaminated by continued exposure to water vapor. The standard Alphatron, as produced by National Research Corp., features rugged construction with a pressure range of from 1 micron to 10 mm. This gage is considerably more expensive than other vacuum gages but is ideal for almost all high vacuum metallurgical operations.

Both thermal conductivity (affecting the Pirani and thermocouple gages) and degree of ionization (affecting the ionization and Alphatron gages) are a function of the physical prop-

erties of the gas being measured. This fact causes difficulty if a variety of gases to be used in a vacuum system and the pressures of these gases are to be determined accurately with one gage. In general, a pressure curve for air may be corrected by a multiplication factor if the composition of the gases being handled is known. In common gases, except for hydrogen and helium, this factor is not very great, but with organic vapors a more pronounced change in gage response is obtained. This situation is the key to the use of gages in connection with leak hunting.⁷ With an evacuated system suspected of leaking, a volatile solvent is sprayed on all areas suspected of harboring leaks. If the solvent penetrates into the chamber through a leak, marked change in gage response may be noted, thus giving a clue as to the location of the leak.

In a subsequent issue, the authors will discuss materials of construction, heat sources, and techniques for melting and casting metals under vacuum.—Ed.

Oxygen in the Bessemer Converter

In 1945 a special converter plant was established at the Kuznetsk Steel Works, Russia, in order to study the production of bessemer steel with the employment of oxygen-enriched or pure oxygen blast. A description of the equipment used, the techniques followed and the results obtained, are presented by V. V. Konjakov, in the *Engineers' Digest*, November 1947, p. 522.

The bottom-blown converter used had one central tuyere and eight concentrically arranged identical tuyeres. The diameter of the tuyeres is given as 15/32 to 9/16 in. Tests were carried out with the charge ranging from 1.4 to 1.8 tons, and the metal volume varied correspondingly between 7 and 9 cu ft.

Tests were carried out with blasts containing 100 pct, 75 pct and 50 pct oxygen, respectively, with the metal charge taken from a cupola of 4 tons per hr capacity. The oxygen was supplied at 142 psi pressure. Quantitative data are given in table I, in which the blowing times and the composition of the blast are also listed.

The following conclusions were drawn by the author on the use of oxygen in bessemer practice:

- (1) Oxygen blast can be applied to metal with low silicon content, although further progress towards a reduction in phosphorus percentage is necessary.
- (2) The steel obtained exhibits increased mechanical strength and has a very low nitrogen content. Macrostructures and microstructures of rolled specimens appear satisfactory.
- (3) Under normal operating conditions the blowing loss is not larger than with normal air blast; in fact, it is sometimes considerably less. Oxygen consumption approximates to theoretical requirements and amounts to some 1410 cu ft per ton of charge.
- (4) Further development of the process must be directed towards a longer service life of the tuyeres, and suitable method for automatic control of the process must also be found.

TABLE I
Experimental Operating Characteristics for Use of Oxygen-Enriched Air in the Bessemer Converter

No. of heat	Length of blow		Weight of charge, Lb	Final weight, Lb			Metal output, Pct	Oxygen in blast, Pct	Total consumption of oxygen, Cu ft		Total consumption of oxygen for blowing with oxygen-enriched air, Cu ft per ton
	Min	Sec		Steel	Slag	Blowing loss			Per heat	Per ton of metal	
1	4	30			Not weighed						
2	4	32	3780	2850	176	Not determined	75.6	100	2415	1449	
								100	2510	1460	
3	5	04	3580	2660	143	264	80.2	100	2350	1290	
4	4	55	3500	2610	198	442	75.0	100	2200	1385	
5	4	50	3960	2960	123	858	75.0	100	2520	1400	
6	4	24	3510	3065	117	183	97.2	100	1885	1180	
7	7	05	3740	3440	77	Nil	92.0	100	2760	1625	
8	6	48	3845	3400	139	Nil	88.2	100	2758	1580	
9	11	25	3585	3375	143	Nil	94.1	73	2830	1646	
10	11	06	3780	3420	209	Unknown	90.8	75	2720	1774	1960
11	13	09	3740	3362	242	Unknown	90.0	50	2190	1290	1847
12	13	10	3915	3750	121	Nil	95.8	50	2120	1260	1600
13	7	33	3255	3075	101	Nil	94.5	100	2800	1892	

Broaching Gasket Faces on Chevrolet Engine Blocks

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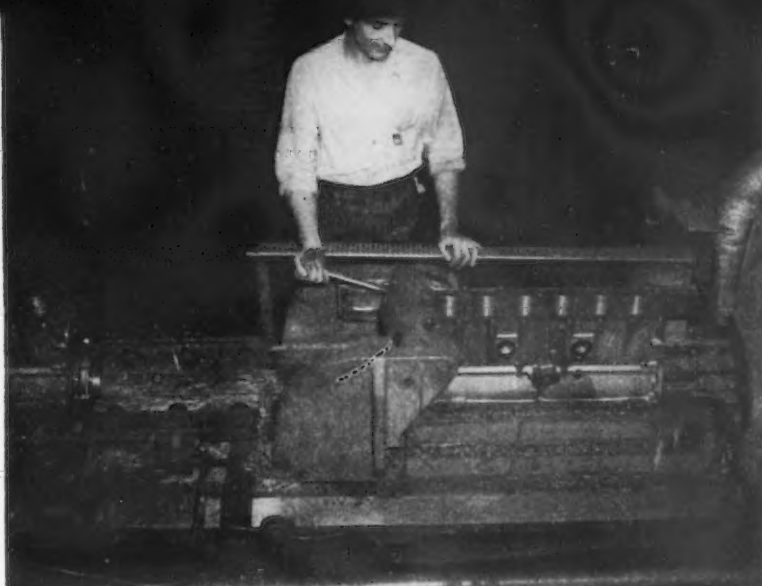


FIG. 1—Loading a Chevrolet cylinder block into the fixture that holds it while it is advanced by hydraulic feed under the broach which is fastened below the bridge-like structure at right.

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FOR some years, Chevrolet's Tonawanda, N. Y., plant has been rough broaching the faces of cast iron cylinder blocks in a fast and highly efficient manner on machines that make cuts on four faces in one complete stroke cycle. Until recently, however, the finish cut on top surface was done by grinding.

The finish cut on the top or gasket face of the block is now done by broaching in the machine shown in accompanying illustrations. In this setup, the broach removes 0.025-in. of metal as the work is advanced by hydraulic feed at the rate of about 40 ft per min. When operated at capacity, the machine can handle about three blocks a minute, including the time needed for loading and for the return stroke of the table.

This is said to be much faster than grinding, which, if used, would require a much larger machine. In addition, the surface produced has a finish that is considered ideal to make a tight fit against the gasket when the latter is drawn up against the face by tightening cylinder head bolts.

For the final broaching operation, the cylinder blocks are advanced to the machine along a roller conveyor and are pushed onto a fixture having a heavy swinging gate that is locked by pressing the gate in position, fig. 1. This gate takes the thrust as the work is traversed under the broach by the hydraulic feed.

This broach is inverted and secured to the underside of a bridge which straddles the work and forms a tunnel through which the work is advanced as broaching proceeds. There are 16 teeth of high-speed steel in the broach, disposed at an angle to the direction of motion so that they make shearing cuts, this tends to minimize vibration and prevents fouling. Each tooth removes about 0.002-in. of metal. Broaches are said to operate from three to five 8-hr shifts before removal to be reground.

At the end of the stroke, a latch, shown in fig. 2, engages the work and holds it as the carriage is withdrawn for reloading. As the next piece is fed through the broach, the new block pushes the previous one forward.

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FIG. 2—Cylinder block, left, emerging from under the 16-tooth broach that removes 0.025-in. of metal in the finishing cut and produces a smooth surface to bear against the gasket, applied later.

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Spinning Magnesium

By LESLIE F. HAWES

President

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METAL spinning, after being overlooked and almost lost in the scuffle and progress of mass production, has made a comeback during the past 15 years, with considerable growth evidenced during the war. New designs in spinning lathes and tools and advances in technique have made it the cheapest of all methods for forming many articles.

Many of the comparatively new materials, such as stainless steel, Monel, Inconel, aluminum and magnesium, have proved particularly adaptable and have been used to good advantage in spinning processes.

For magnesium, satisfactory techniques were developed only after considerable experimentation and research. As a result of this work many magnesium parts in gages from 0.025 to 0.250 are now being successfully spun. Shapes requiring only small deformation may be spun

cold using a tallow or soap lubricant, but work demanding severe forming must be spun hot.

In hot spinning the chuck is preheated to the required temperature, as shown in fig. 1, then the flat blank is positioned and brought to heat while rotating. Inasmuch as spinning quality magnesium must be in an annealed condition the temperature range for forming is from 400° to 500°F, depending upon the material thick-

Spinning of aluminum, stainless and other metals was described in "The Practical Aspects of Metal Spinning," THE IRON AGE, Feb. 12, 1948, p. 76.—Ed.

ness. When working on small quantities the heating is usually accomplished by using an oxyacetylene torch applied directly to the surface of the chuck and material, as shown in fig. 2. For production in greater quantities, it is economical to install a permanent, automatically

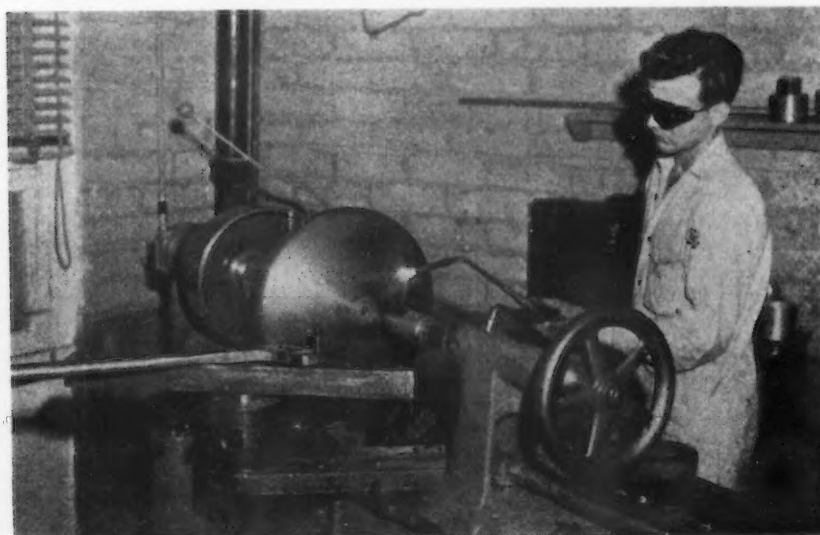


FIG. 1—Operator is shown using an ordinary oxyacetylene torch to preheat the chuck for a magnesium spinning job.

Practical considerations of magnesium spinning operations are discussed in this article. Lubricants for both hot and cold work are suggested, chromic acid cleaning solution formulas for removing graphite and other lubricants are given, and heating procedures for jobs demanding severe forming of the metal are described.

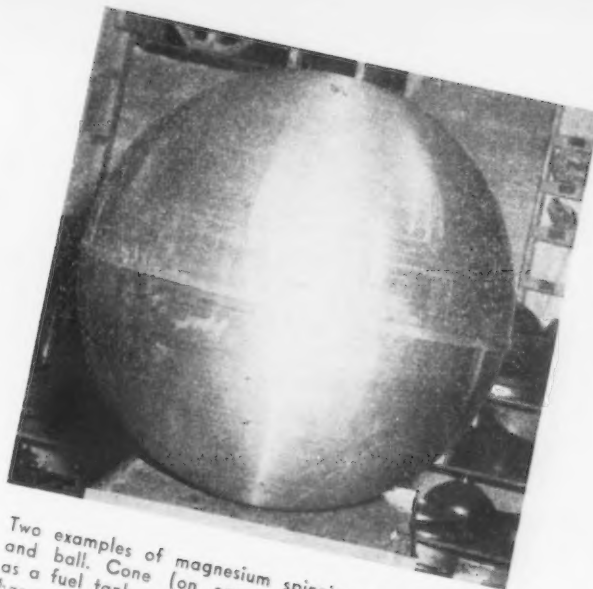
controlled, standard type gas burner for heating the chuck from the inside out.

The coefficient of thermal expansion for magnesium alloys runs about three times that of steel. Therefore it is necessary that the forming chuck be made slightly oversize in order that the finished magnesium part will not be undersized after cooling.

The lubricants used for spinning magnesium can be purchased from many sources or made in the shop. All lubricants must be able to withstand a temperature of 600° to 700°F. Powdered colloidal graphite, grade 620, suspended in carbon tetrachloride is quite satisfactory. Commercial lubricants which are satisfactory for short run applications are Lubriko 7X and Konder 105.

After forming, parts which have been lubricated with oils must be given a preliminary cleaning in a vapor degreaser or alkaline cleaner. This is followed by dip cleaning in a chromic acid solution (1.5 lb chromic acid diluted with water up to a volume of 1 gal) for 1 to 5 min at room temperature.

When parts have been lubricated with colloidal

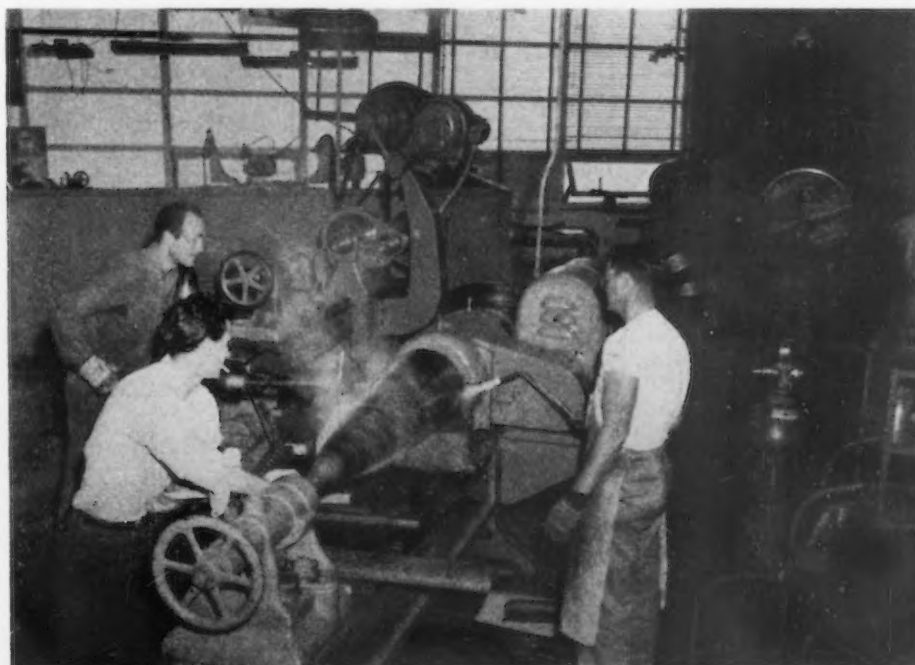


Two examples of magnesium spinning are this cone and ball. Cone (on opposite page), to be used as a fuel tank, was spun to a thickness of 0.125 in., has a 36-in. max diam, is 55 in. long and weighs 37 lb. Ball (above) is spun to 0.081 in. thickness, 36-in. diam and weighs 19 lb.

graphite it is advisable to use a cleaning solution of 1.5 lb chromic acid plus 4 oz of either calcium or magnesium nitrate diluted with water to a volume of 1.09 gal. This solution is effective at room temperature, parts customarily being immersed for 2 to 5 min. After cleaning, parts are rinsed in cold running water and then dipped in hot water to facilitate drying.

Spinning tools used for magnesium are made from tool steel, hardened and polished. As in all spinning operations, the selection of turning speed is determined by the size of the blank and the thickness of the material.

FIG. 2 — Magnesium cone of 0.040 in. stock is shown being spun at a temperature of about 400°F. The spinner, at the far left, is manipulating a forming tool while the work is heated with an oxy-acetylene torch by the operator on the right.



Fabricating Automobile Molding Clips

By HERBERT CHASE

For faster and better appearing installation of stainless molding trim on automobiles, Buick has developed an elliptical shaped clip to which is staked a stud for assembly to panels. The production of this assembly, described in this article, utilizes a progressive die with a dial arrangement for staking the screw to the stamping.

AMONG the problems encountered in assembly of sheet steel parts at the Buick Motor plant in Flint, Mich., is that of fastening decorative steel moldings to steel panels. These moldings are produced from polished stainless steel strip 0.015 in. thick formed into a flattened C-shaped section. The inwardly turned flanges of the section fit against the mating panel and are fastened by stamped clips that are assembled to studs in such a way that both the clip and the screw head are completely hidden inside the C-shaped section.

Until recently, these clips were oblong, about $\frac{3}{4}$ in. wide and had a screw fastened at the center. Notches were cut in the ends of the clips to form ears that engaged the flanges of the moldings and were clinched to the flanges after the clips had been spaced so that screws would enter holes pierced in mating panels. But tools used in clinching sometimes produced slight raised dimples on exposed surfaces of the thin moldings and these blemishes detracted from appearance. It was also bothersome to space the clips to fit different hole patterns in mating panels.

To overcome these troubles, Buick has developed a new type of clip of near-elliptical shape, shown in fig. 1, and the clip is being produced in a Ferracute PG5 press in the setup shown in fig. 2. Manufacture involves production of the stamped portion in a progressive die, fig. 3, and subsequent staking of a screw fed from the rotating hopper to this stamping, seen near the center of fig. 2.

With a clip of this shape, the narrow width of which fits inside the grooves formed by the flanges of the molding, assembly of the clips to the molding is done by merely giving the clip a quarter turn. No clinching tool is needed and the friction grip that the clip makes with the molding is sufficient to hold it yet permit it to be shifted longitudinally along the molding so that the screw shanks of a series of clips will fit any panel hole pattern. This permits convenient yet rapid assembly both of clips to moldings and of moldings to panels. After screw shanks are passed through panel holes, nuts are applied to draw the clips and molding firmly against the panel.

Fig. 4 shows the position of the strip on the face of the progressive die, while fig. 5 is a plan view of the die assembly. The stamping is produced from strip steel 0.035 in. thick and 2 in. wide, fed from a reel.

In the first position of the die, a spacer hole of hourglass shape is stamped out and in the second position a small circular central hole is pierced. At the third station, initial forming is done and, at the fourth station, the work is restruck to finish the forming. These operations curl edges

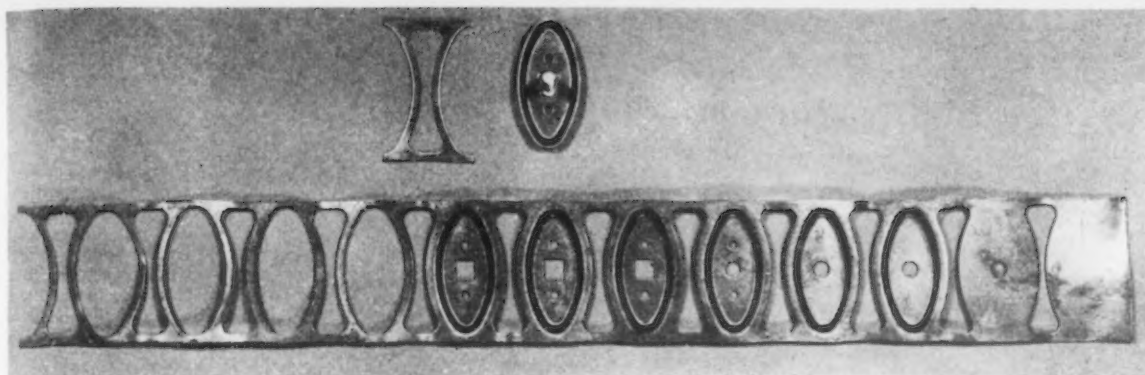


FIG. 1—This strip stock has been fed through the progressive die. Above the strip are a clip staked to a screw and a piece of flash clipped from the end of the strip.

upward and give the work a dish-like shape. Two spanner holes are pierced at the fifth station, and at station No. 6 the central hole, thus far used as a pilot pin hole, is repierced to give it a square shape.

This square hole subsequently fits over the cylindrical shank of the screw and the metal at a shoulder on this shank is expanded against and over the sides of the square by a staking punch. This fastens the screw to the stamping and prevents the screw from turning in the hole. At the next two stations, seven and eight, no work is done on the piece but at the ninth station it is blanked off the strip and is pushed through a clearance hole, over a screw shank and into a recess of a dial. There the stamping is gripped by a pair of pivoted fingers that are separated, against the action of a compression spring. These fingers, shown in fig. 5, open by lowering a con-

ical ended pin into a mating tapered recess between the fingers. At the end of the progressive die, the flash is clipped off and falls down a chute into a scrap box. This chute can be seen in fig. 2.

The function of the dial is to move the stamped clips and headed screws into successive positions where they are assembled and staked together. Screws are fed down a chute or magazine from the rotating hopper shown in fig. 2. They are fed, head downward, into recesses between dial fingers. At dial station A, in fig. 5, dial fingers opened by a conical pin receive the screw.

After the screw drops into position, the punch is withdrawn, the screw is gripped by the fingers and the dial is indexed 45° counter clockwise, as viewed from the top, to the B position on the dial. Following the next 45° indexing the screw arrives at the front or C dial position. At this

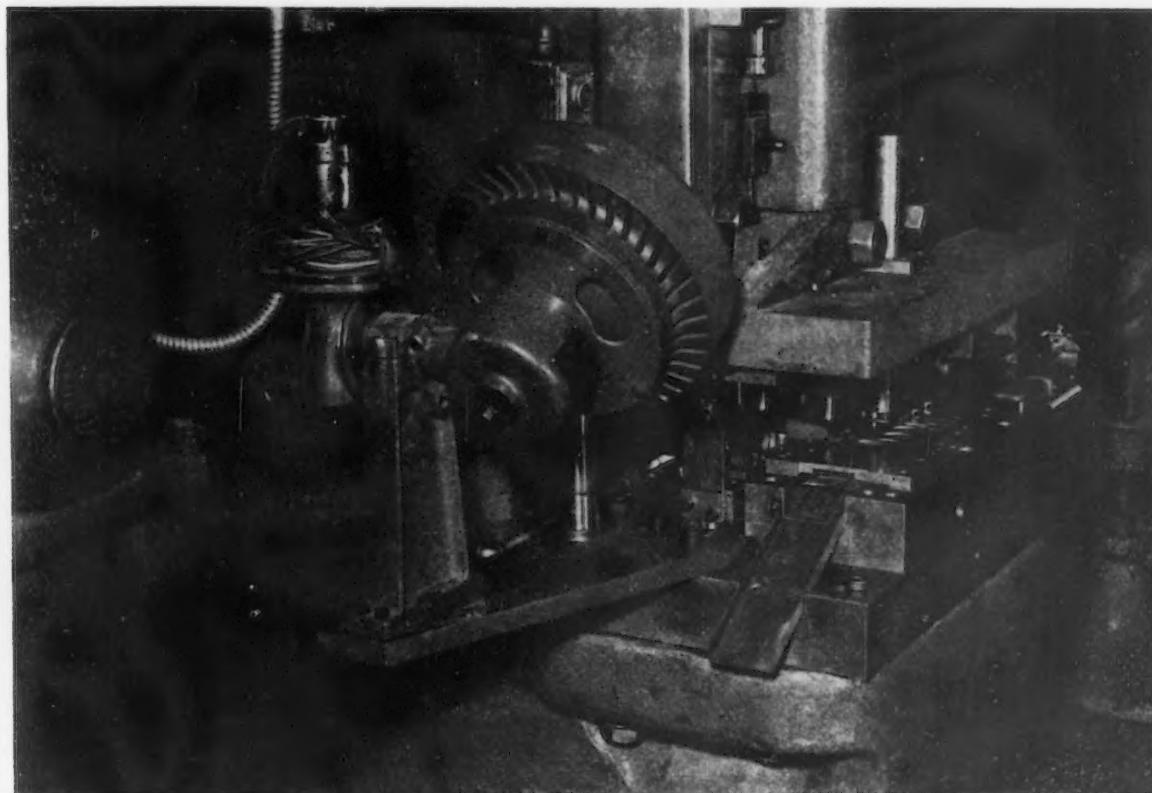


FIG. 2—The automatic setup shown here is ready for operation. The progressive die is at right and the rotating hopper for feeding screws to the magazine is at upper center. Because the dial is mostly covered by the die, it cannot be seen in this view.

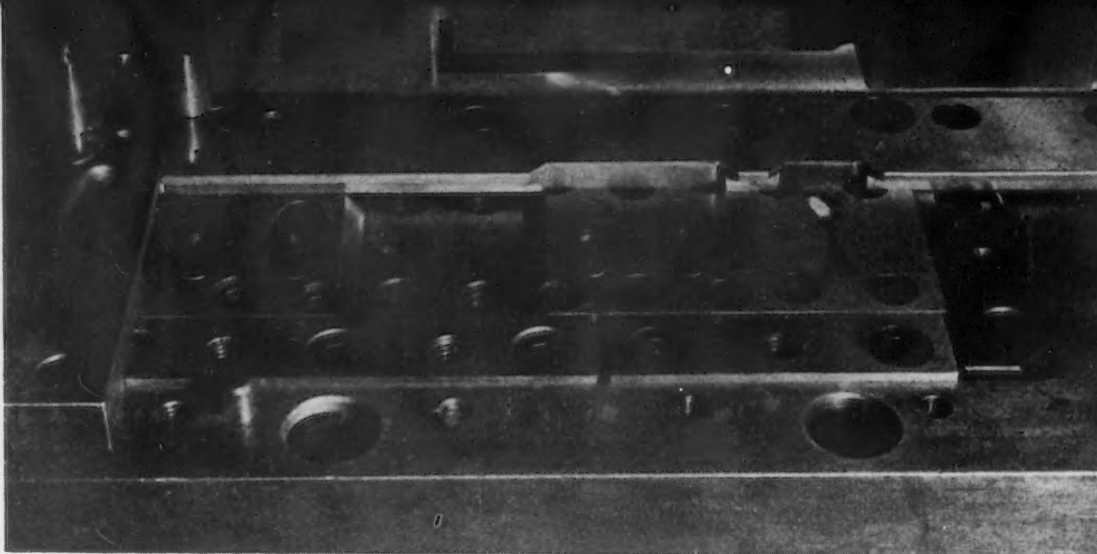


FIG. 3—Close-up of lower portion of the progressive die. At upper left is the punch that transfers the finished stamping to the dial, which is hidden below the die.

position, under the opening of the progressive die, a hollow punch delivers a formed stamping from the progressive die. This stamping is dropped over the shank of the centered screw which is held upright by a spring pad and is gripped by the fingers previously mentioned.

Dial station D is dead but at station E, 180° from where the screw was loaded, the screw and stamping are assembled by the action of a hollow punch, shown in fig. 6. This punch performs a staking or swaging operation on the shoulder of the screw shank just below the threaded portion, spreading the shoulder over the edges of the square hole in the stamping and expanding the shank against the flats of the square. Thus, the stamping and screw are permanently joined in such a way that the screw shank grips the stamping so that it cannot move axially or turn in reference to the screw.

As fig. 6 shows, the punch for staking holds three spring plungers. Two of these hold the stamping firmly against a flat die surface and the central plunger positions on the upper end of the screw to hold it central while the punch telescopes over the threaded portion. This is necessary because the fingers, which have gripped the screw up to this point, have to be opened before the punch strikes the screw shoulder. This opening is again effected by a tapered pin which forces the fingers apart before the punch strikes

its blow. As the punch is withdrawn, the fingers remain open long enough for the stamping assembly to be ejected. Then the dial indexes, carrying fingers to their F position, which is dead.

At the G dial position, there is a safety knock-out which functions as such only if the screw and stamping assembly did not eject as intended at the E station. This safety prevents any possibility of jamming or damage such as might occur if the screw and stamping assembly should be advanced into the A position which is the starting station, and another screw is fed as a part of the next cycle. H station is dead.

While these descriptions refer only to individual pieces whose progress through die and dial stations is outlined, the whole setup is progressive and automatic. There is a piece in or just moved from each die and dial position as the progression takes place. In consequence, a finished and assembled piece drops from the machine at the end of each working stroke of the press, which operates at a rate of 47 pieces per min.

All the operator needs to do in the operation is to see that ribbon stock is fed to the die by the automatic feed, that screws are loaded into the hopper as needed, and that nothing goes wrong to interfere with proper functioning of the setup as a whole.



FIG. 4—A strip of stock over the die. Piercing and forming punches cannot be seen.

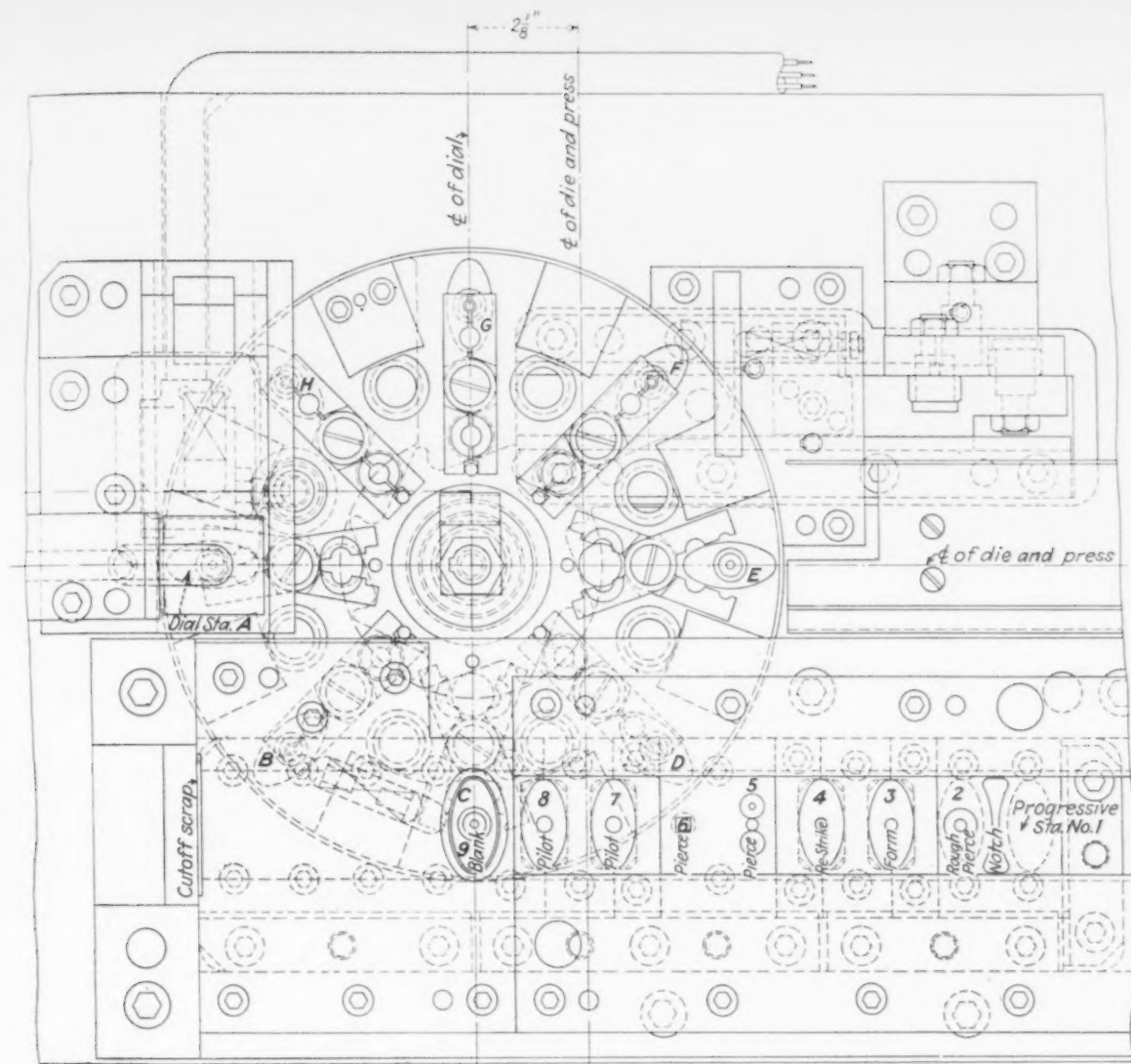


FIG. 5—Plan drawing of the progressive die and of the dial into which completed stamped clips are fed along with screws from a magazine.

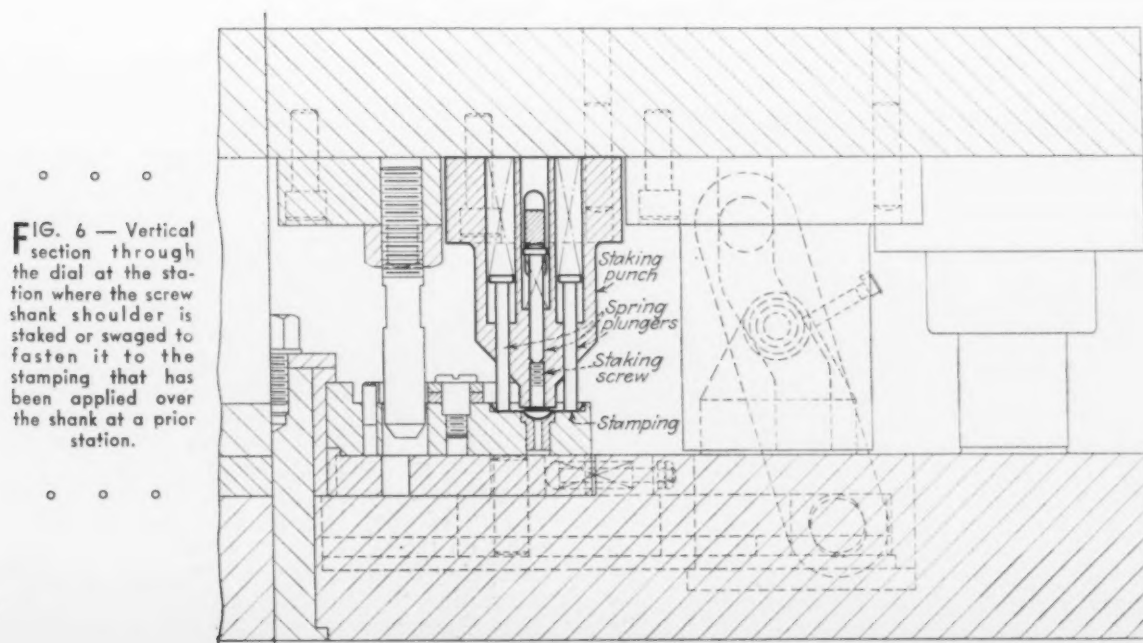


FIG. 6 — Vertical section through the dial at the station where the screw shank shoulder is staked or swaged to fasten it to the stamping that has been applied over the shank at a prior station.

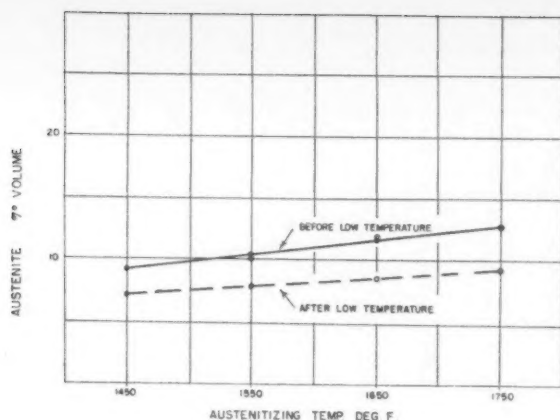


Fig. 6—Steel "A"

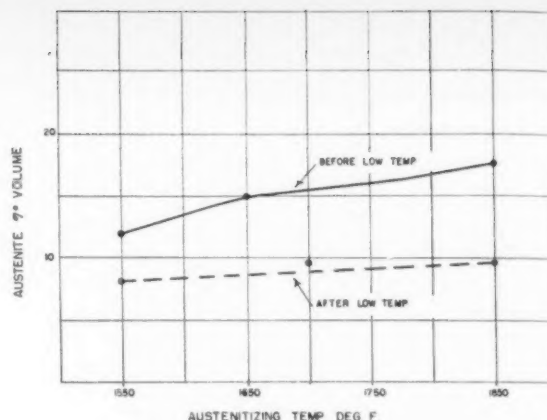


Fig. 7—Steel "B"

Effect of austenitizing temperature upon

Low Temperature Treatment

Presenting data indicating the influence of austenitizing temperature on retention of austenite, the author continues his discussion of the effects produced by low temperature treatment upon heat-treated steels. An interesting correlation is shown between the volume of retained austenite before and after low temperature treatment. Also discussed in this second part of a three-part article, is the effect of tempering temperature on (1) hardness and (2) retained austenite volume of both cold-treated and noncold-treated steels.

IT was previously stated that the transformation characteristics of any steel were affected to a great extent by the austenitizing temperature. Therefore, to attempt to show a transformation curve for each set of conditions, the number of TTT curves would be almost infinite. Figs. 1 through 5 show the transformation characteristics for five different steels when austenitized at temperatures generally regarded as optimum for most practical purposes.

The author has, however, done a great deal of research work in determining the effects of austenitizing temperatures on the five types of steels under discussion. Figs. 6 through 10 show the results of work along this line. In fig. 6 is indicated the percent of austenite retained after the quench to room temperature from the optimum austenitizing temperature (1450°F) and subsequently for higher austenitizing temperatures up to 1750°F. The dotted line labeled "after low temperature" represents the transformation in the same specimens after they were subjected to -125°F and then measured at room temperature.

While the amount of retained austenite does increase with austenitizing temperature, the amount is not great in case of a simple steel such as type A shown in fig. 6. The amount of austenite

retained starting at 9 pct for an austenitizing temperature of 1450°F increases only to 13 pct for an increase of 300°F in austenitizing temperature. It will be also observed that the increase in transformation affected by the treatment at -125°F varies from approximately 2½ pct for this steel when austenitized at 1450°F

In part I of this article, THE IRON AGE, Feb. 12, 1948, p. 69, the author associated transformation characteristics of five different types of high carbon steels with basic fundamentals of heat-treating, by means of TTT curves. In a subsequent issue, data will be presented concerning medium carbon and carburizing grades of steel. Also, certain recommendations will be given for the use of the practical metallurgist and heat treader.

to about 4 pct when the same steel is austenitized at 1750°F. Fig. 7 is a similar chart showing the effects of austenitizing temperature on the amount of retained austenite in type B steel. In this case the lowest austenitizing temperature used was the assumed optimum (1550°F) which was then gradually increased to 1850°F.

It is obvious that even the relatively small amount of alloy in type B steel has a marked effect on the percent of austenite retained after quenching from various temperatures. It is also interesting to note that effect of treating the same specimens at -125°F is increased and

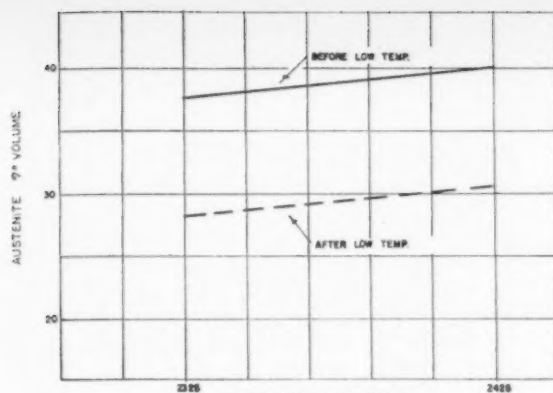


Fig. 8—Steel "C"

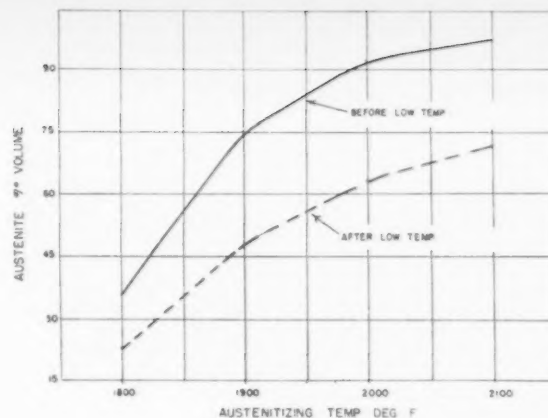


Fig. 9—Steel "D"

retention of austenite in various types of steel.

Of Steel

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that the amount of austenite remaining after the low temperature treatment is almost as low in those specimens austenitized at 1850°F as for similar specimens austenitized at the optimum temperature of 1550°F. Fig. 8 is another similar chart showing the effect of austenitizing temperature on the type C 18-4-1, high-speed steel. In this case it was not possible to use as wide a temperature range for austenitizing, because this type of steel begins to show eutectic melting at 2450° to 2500°F. Therefore, only the range of 2325°F (regarded as optimum) to 2425°F is shown in fig. 8. There is shown a gradual increase in the amount of austenite retained with even a 100°F temperature increase, but it is not great (only about 2 pct). It is interesting to note that the same specimens treated at -125°F show an appreciable decrease in austenite and the solid and dotted lines in fig. 8, showing the results of before and after -120°F, are almost parallel.

Fig. 9 shows results as obtained in a similar manner with type D steel. In this case the author has again employed a 300°F temperature range for austenitizing, ranging from the optimum of 1800° to 2100°F. It is obvious that this type of steel has a great tendency to remain austenitic. Specimens oil quenched to room temperature from 1800°F show approximately 35 pct austenite. This percentage then rapidly increases to 96 pct for specimens oil quenched from 2100°F. The effect of treatment at -125°F is greater on this type of steel than any other type

studied. It may be noticed that specimens austenitized at 2100°F show a transformation of about 25 pct effected by treatment at -125°F.

Fig. 10 shows results of type E steel when studied in a similar manner. Again a 300°F temperature range, starting at the optimum of 1950°F and increasing to 2250°F, was employed for austenitizing. Type E steel does perform in a manner somewhat similar to type D, except that the amount of austenite retained after air cooling from the optimum temperature is even higher than type D (45 pct for type E) and the treatment at -125°F is noticeably far less effective. Specimens air cooled from 2250°F were actually found to be 97.5 pct austenitic and were still 96 pct austenitic after treating immediately to -125°F and allowing to return to room temperature prior to measuring.

So far this discussion has been principally built around actual transformation. Changes in hardness or other physical properties induced by these transformations have not been discussed. While it is true that it has been the general opinion that the primary purpose of low temperature treatment was to effect increased hardness values, it must be remembered that hardness readings are, with the very best of hardness testing equipment, relatively rough measurements. Particularly if the individual does not have some understanding of the actual transformations which take place during heat treatment, hardness readings alone may be quite misleading. Table

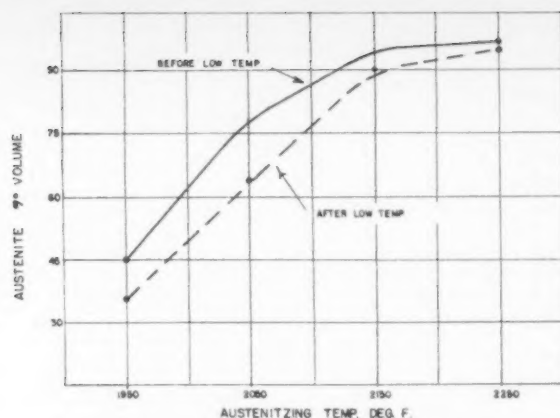


FIG. 10—Effect of austenitizing temperature upon retention of austenite in type E steel.

III shows the results of hardness tests made on the five steels under discussion. Hardness readings were all taken on ground and polished flat surfaces with a Rockwell machine which was checked for accuracy after every five readings. The single reading tabulated for each type after subjecting to the temperatures shown in the left hand column is the average of five hardness readings taken on each specimen.

The specimens were all austenitized at the temperature regarded as optimum for the particular type of steel; i.e., type A was quenched in water from 1450°F to room temperature, type B was quenched in oil from 1550°F, type C was air cooled from 2325°F, type D was oil quenched from 1800°F, and type E was air cooled from 1950°F to room temperature (75°F). One set of specimens was carefully checked for hardness at room temperature and then cooled to 50°F, allowed to return to 75°F, and again measured. This set was then discarded and another set austenitized and quenched under identical conditions, cooled to 25°F, and measured after specimens had again assumed room temperature. This procedure was carried on for the various steps in temperature for the cold treatment down to -155°F. By this procedure no one specimen

was allowed to receive more than one cold treatment, thus eliminating a possible variable.

It may be readily observed in studying table III that there is a gradual increase in hardness values for all five types though in no case could the increase be termed as phenomenal. As might be logically expected, the effect produced by low temperature treatment on these steels, when austenitized at abnormal temperatures, is much greater.

Type D steel, austenitized at 2100°F, shows (fig. 9) 96 pct austenite at room temperature and then a marked decrease after cooling to -125°F, and also shows a hardness increase of 14 points Rc. Specimens austenitized at 2100°F measured 40 Rc after quenching to room temperature and 54 Rc after the low treatment. Therefore, one can predict the amount of increase in hardness value by the distance between the two curves in figs. 6 through 10. The reason for the increased effect of low temperature on specimens austenitized at abnormal temperatures is attributed to the fact that the higher austenitizing temperatures drastically lower the M_s temperature and subsequently the entire martensitic formation range.

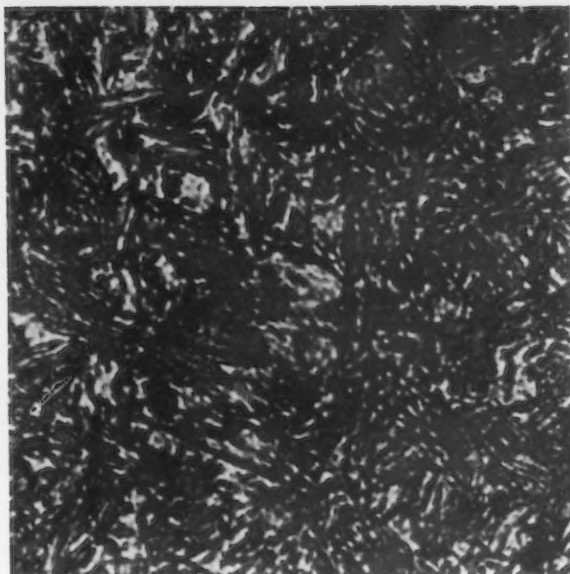
Actually such relatively phenomenal transformations and subsequent increases in hardness values as just discussed in type D steel are of little if any practical value, since there should normally be no reason for employing such abnormal austenitizing temperatures. It has often been stated that low temperature treatment would serve to aid in the correction of any tool or other part which had been maltreated in the cycle of heat treatment. This is actually a very broad statement and could be true only to a limited extent. The effect of cold treatment is lessened on any steels which have been austenitized at subnormal temperatures or for some reason show an abnormally fine grain and too much undissolved carbide. Therefore, since the function of cold treatment is definitely confined to the transformation of austenite, one should consider carefully before stating that maltreatment had been corrected just because an extraordinary increase in hardness had been effected.

Many microscopic examinations were made during the study of low temperature treatment. The author has found that examination of specimens at high magnification is somewhat similar to the hardness test in revealing the transformations which have been effected. That is, one can estimate and obtain some general idea of what changes may have taken place from low temperature treatment, but accurate measurements must be made by some other means. Microscopic studies do, however, serve as somewhat of a check on other methods.

As a matter of academic interest, rather than for practical value, some results of studies made by means of the metallurgical microscope are included in this article, see figs. 11 and 12. Photomicrographs showing the structures of specimens austenitized at abnormal temperatures are far more revealing, so that only this type is shown.

Fig. 11 is a photomicrograph of a specimen of type A steel (A) water quenched to room temperature from 1750°F, and (B) after treating at -155°F. Both structures are typical of those

TABLE III					
Hardness Values After Various Degrees of Cold Treatment					
(Chemical composition of the various types of steel listed in this table are given in table II)					
Temperature, °F	HARDNESS, Rc				
	Type A	Type B	Type C	Type D	Type E
75°	66	65	64	65	60
50°	66	65	64	65	61
25°	66.5	65	64	65	61
0°	66.5	65	64.5	66	61
- 25°	66.5	65.5	65	66	61.5
- 50°	67	65.5	65	66.5	61.5
- 75°	67	66	65	67.5	62
- 100°	67	66	65.5	67.5	62
- 125°	67	67	66	68	62
- 155°	68	67	66.5	68	63



A

FIG. 11—Type A steel (A) water quenched from 1750°F and (B) treated at -155°F. 1000X

B

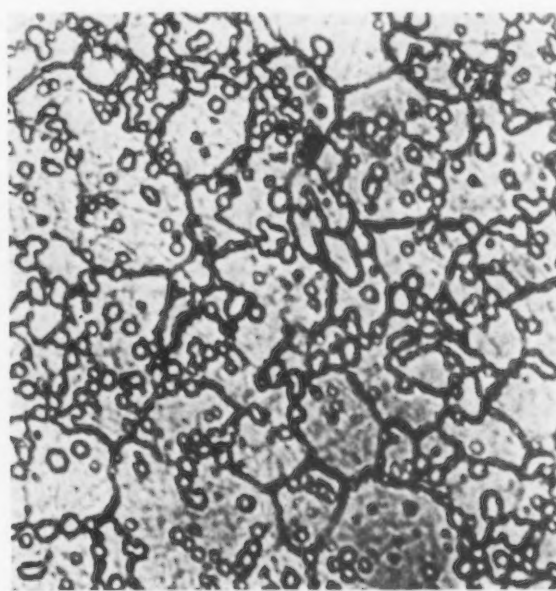
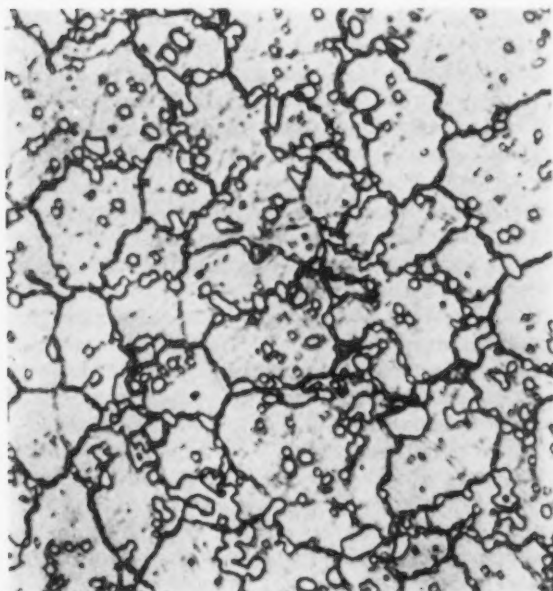
created from an extremely coarse austenitic grain. The decrease in the percentage of austenite is obvious in (B) as compared to (A). Fig. 12 shows the microstructure of type C steel (A) after having been austenitized at 2425°F and air cooled to room temperature, and (B) after treatment at -155°F. The change in the microstructure of (B) as compared to (A) is also obvious. Fig. 12 (B) shows a microstructure which has the appearance of having been subjected to some tempering treatment.

Up to this point the discussion has been entirely confined to the five steels shown in table II and the effects produced by low temperature treatment upon the retained austenite after they have been quenched to room temperature. The cases would indeed be rare (or at least they should be) when any of these steels would be put in service without some sort of subsequent tem-

pering treatment. The question therefore arises—What is the ultimate effect of low temperature treatment after the particular steel has been tempered and ready to begin service?

No direct answer can be given to such a question without full consideration of the type of steel and the tempering temperature used. Figs. 13 through 17 show results of work done along this line and should be of considerable aid in giving a practical answer to the above question. It has been found that for any of these five steels under study, as the tempering temperature is increased a temperature is reached at which the retained austenite begins transformation, until a temperature is encountered at which transformation is entirely completed. This temperature depends entirely upon the composition of the steel and the amount of austenite which has been retained. To obtain the data shown in figs. 13

FIG. 12—Type C steel (A) air cooled from 2425°F and (B) treated at -155°F. 1000X.



A

B

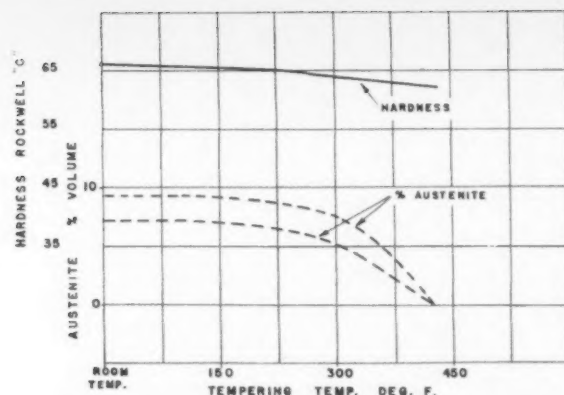


FIG. 13—Chart showing effect of tempering on hardness and transformation in type A steel.

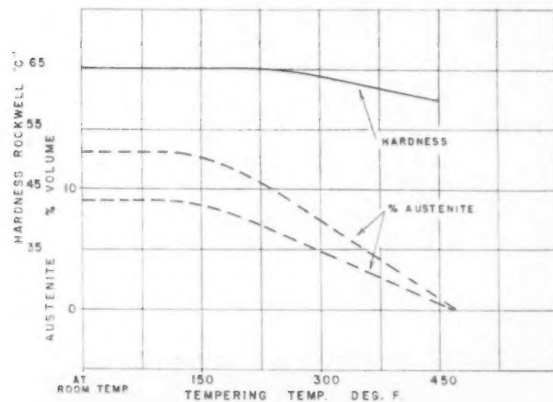
through 17, specimens of each of the five types of steel were austenitized at their optimum temperature and cooled to room temperature. A portion of these specimens was tempered in steps without the cold treatment while others were tempered in the same steps after having been subjected to -125°F .

In all cases specimens were immediately discarded after having been tempered at one temperature and a different, but identical, specimen used for the next temperature step. All measurements of percent retained austenite were made after the specimens had again assumed room temperature.

Referring to fig. 13, this chart shows the behavior of type A steel relative to the transformation of austenite during tempering. A curve showing the gradual decrease in hardness is shown near the top of the chart as a matter of interest, for it is well known that this type of steel begins to show a hardness decrease after being heated to about 250°F . The two lower curves marked "austenite" show the transformation as effected by tempering temperature on the two types of specimens, with the upper curve representing the transformation for specimens not subjected to low temperature treatment.

It will be observed that small percentages of austenite persist up to about 425°F . It is also interesting to note that the two lower curves meet at that temperature. Considering the tempering temperature of 300°F , which is very com-

FIG. 14—Chart showing effect of tempering on hardness and transformation in type B steel.



mon practice for this type of steel, specimens not subjected to low temperature treatment show 7.5 pct austenite as compared to 5 pct for those which were treated at low temperature.

The chart in fig. 14 shows results of a similar study made on type B steel. Again the uppermost curve shows the decrease in hardness as the tempering temperature is increased, and the dotted curves show the decrease in retained austenite as effected by tempering. The upper dotted curve shows the behavior for specimens not low temperature treated while the lower curve shows results for identical specimens which have been subjected to -125°F . It is interesting to note that considering a tempering temperature of 300°F (a temperature also commonly used for type B steel), the amount of austenite for both types of specimens is exactly the same as for type A steel, although a slightly higher tempering temperature (about 475°F) is required in order to effect complete transformation. All specimens used to obtain data shown in fig. 14 was austenitized at 1550°F .

Fig. 15 is a chart showing the same sort of data for type C steel, which behaves in an entirely different manner. This type, like nearly all such high alloys, tends to retain high per-

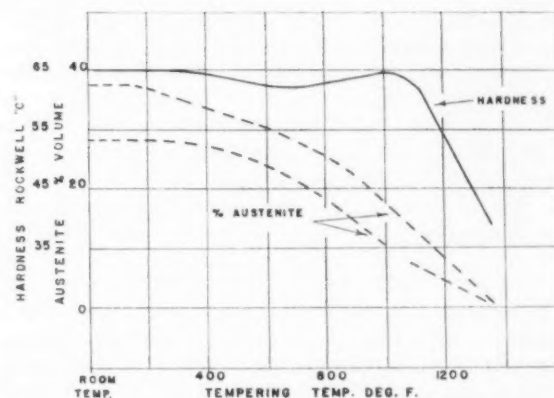


FIG. 15—Chart showing effect of tempering on hardness and transformation in type C steel.

centages of austenite when cooled to room temperature. A high percentage of this austenite is then transformed during the tempering operation, usually done at temperatures much higher than commonly used for the straight carbon or low alloy types.

Transformation of such high percentages of austenite induces a condition which is termed *secondary hardening*—this is illustrated by the uppermost curve. It will be observed that as the tempering temperature is increased, the hardness at first decreases and then increases, to a value about equal to the initial hardness in the as-quenched condition. The peak of this secondary is shown in fig. 15 to occur from tempering at 1000° to 1050°F , which is normal for this type of steel austenitized at 2325°F . After the peak of the secondary is reached the hardness then decreases rapidly as the tempering temperature is increased. A steel of this type is very reluctant to transforming completely. Irrespective of whether the specimens were treated

at low temperature, a 1350° F tempering temperature was required to effect a 100 pct transformation.

It is evident that specimens austenitized at 2325° F, quenched to room temperature, cooled to -125° F, tempered at 1050° F, and again cooled to room temperature, show a greater transformation by about 8 pct compared to otherwise identical specimens not low temperature treated. It is agreed among most metallurgists that multiple tempering cycles are usually desired for alloys such as type C steel. Some further transformation is effected by additional tempering cycles, though the most valuable achievement of multiple tempering is to relieve stresses induced by the volumetric changes which occur during transformation.

Fig. 16 is still another chart showing similar data for type D steel. Specimens used for obtaining data shown on this chart were austenitized at 1800° F and oil quenched to room temperature.

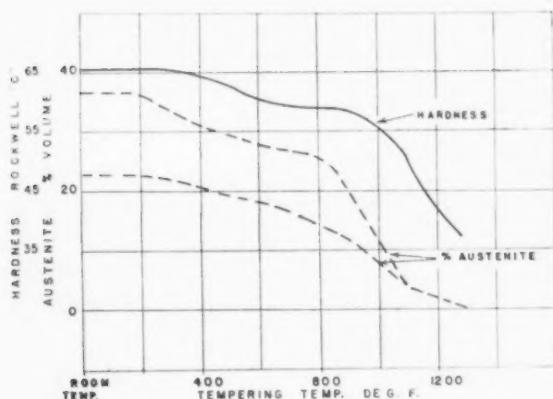


FIG. 16—Chart showing effect of tempering on hardness and transformation in type D steel.

As in case of the other steels under discussion one set of specimens was used without cold treatment for tempering at various steps, the results of which are shown in the upper dotted curve. The other set of test specimens was first subjected to -125° F before tempering in the same manner. Results of the latter test are shown in the lower dotted curve.

A typical hardness v. tempering temperature curve is shown near the top of the chart. It will be noticed that type D steel also exhibits secondary hardening characteristics though not so pronounced as observed in type C steel. Type D steel, being one that is used for a wide variety of purposes, may be subjected to any one of several tempering temperatures, depending on its end use. In many cases this type is tempered at 350° F, thus retaining full hardness. Other applications may require a higher degree of toughness, which may be obtained at the sacrifice of some hardness by tempering at higher temperatures, even up to 900° F.

It will be observed from fig. 16 that this alloy is also reluctant to transforming completely. There is actually some austenite remaining until a tempering temperature of about 1300° F is reached. The low temperature treatment is par-

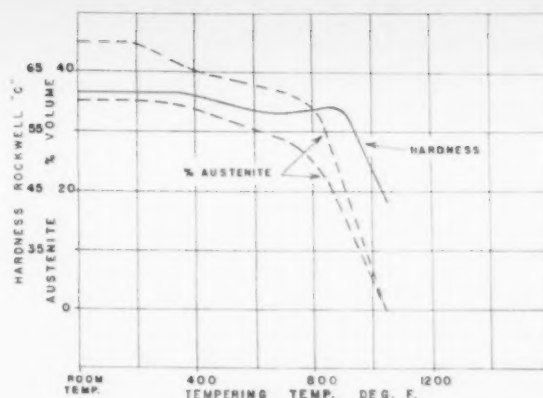


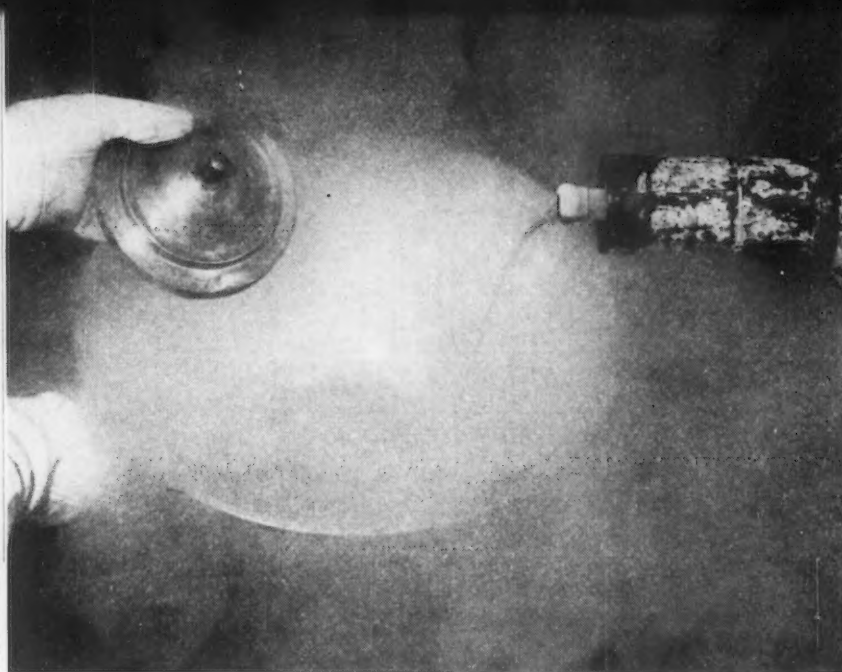
FIG. 17—Chart showing effect of tempering on hardness and transformation in type E steel.

ticularly effective on this steel if a tempering temperature of only 350° to 400° F is employed. In this range some 13 pct of the retained austenite is transformed which is accompanied by a substantial increase in hardness (see table III). Even for tempering temperatures up to 900° F there is still a marked effect shown by the use of low temperature treatment.

Fig. 17 is another chart showing results of similar work done with type E steel. This alloy also has a tendency to retain high percentages of austenite after cooling from the austenitizing temperature and consequently exhibits secondary hardening characteristics. The solid line as indicated represents the hardness after various tempering temperatures. For these test specimens, which were austenitized at 1950° F, the peak of the secondary hardness occurs at approximately 900° F. As before, the upper dotted line shows the percent austenite for specimens not subjected to low temperature and the lower dotted line shows results for identical specimens except they were subjected to -125° F prior to tempering.

Type E steel is another alloy which may be tempered at any one of several tempering temperatures depending upon the application. If it is desirable to employ a relatively low temperature for tempering, the cold treatment is obviously more effective than when the higher temperatures are employed, since the two lines do meet at about 1025° F, showing 100 pct transformation in both sets of specimens.

A discussion on the effects of low temperature upon the higher alloy steels would hardly be complete without some mention being made of the cobalt steels. The author will not attempt to give complete data on this class of steels because there are so many involved. One of the high-speed steels, containing 12 pct Co was studied to some extent with respect to the effects of low temperature. It was found that this particular alloy tended to retain quite a high percentage of austenite after cooling from the austenitizing temperature—somewhat higher than 18-4-1 (type C steel). It was also found that the treatment at -125° F was quite effective, actually transforming a higher percent of austenite than was effected by a similar treatment with 18-4-1.



Economical

By **WALTER G. PATTON**
Detroit Regional Editor,
THE IRON AGE

FIG. 1—Immersion of Cerro-type dies in liquid nitrogen intensifies the alloy's hardness and enables it to withstand stamping pressures. Here, a Cerrobend male die is being placed into the chilling bath.

BY cooling in liquid nitrogen dies made of Cerro-type low-melting alloys, Ford Motor Co. research engineers have developed a new technique that can be used to produce experimental sheet metal stampings in from 24 to 48 hr. By cooling these Cerro-type alloy forming dies to about -320°F , as shown in fig. 1, up to 250 experimental parts can be stamped before the die must be rechilled. By providing some form of protection to prevent a rapid rise in die temperature, even more stampings can be run before rechilling is necessary.

Recent tests on an experimental die indicated that the hardness of the die alloy increased from 9.2 Bhn at room temperature to 45 Bhn after immersing in liquid nitrogen. While still in the experimental stage, the new technique has already proved adequate for the production of a number of experimental parts that might otherwise have required several months to produce.

Five different Cerro-alloys have been thus far

investigated. According to Ford engineers, Cerrobend is adequate for most applications, although Cerrotru has certain advantages where accuracy requirements are more rigid.

Cerrobend expands 0.001 in. per in. during solidification and grows rapidly for 1 hr after solidification. Growth continues at a decreasing rate for 1000 hr, and total expansion is approximately 0.006 in. per in.

Cerrosafe shrinks slightly during solidification and exhibits further shrinkage during cooling to room temperature. Maximum shrinkage occurs 15 to 20 min after casting and is of the order of 0.0015 in. per in. This alloy begins to grow approximately 30 min after casting, and 1 hr after casting growth has exactly compensated for the shrinkage occurring during and just after solidification. Growth is fairly rapid for 60 to 70 min. and continues for 50 hr at decreasing rates. Overall growth of Cerrosafe is 0.0022 in. per in.

Cerromatrix expands slightly during solidifi-

TABLE I
Physical Properties of Cerro-Type Alloys

Alloy	Composition					Melting Temperature, deg F	Freezing Range, deg F	Density Lb per Cu in.	Tensile Strength, Psi	Elongation in 2-in., Pct	Brinell Hardness No.
	Bi	Sn	Cd	Sb	Pb						
Cerrobend	50	13.3	10		26.7	158	158-158	0.339	5,990	220	9.2
Cerrosafe	40	11.5	8.5		40	163	194-158	0.341	5,400	220	9.2
Cerromatrix	48	14.5		9	28.5		440-218	0.343	13,000	1	19
Cerrobase	54.9				45.1	255	255-255	0.371	6,400	60-70	10.2
Cerrotru	57	43				281	281-281	0.315	8,000		22
Cerrolow 105						105					
117						117					
136						136					

Short Run Stamping Dies

cation; grows rapidly for several hours after solidification; and overall shrinkage is about 0.0015 in. per in. The alloy then begins to grow and growth compensates for the shrinkage in about 10 hr after casting. Slow growth continues for about 1300 hr and reaches a total of 0.0022 in. per in.

Cerrotru expands slightly during solidification and shrinks just enough during cooling to room temperature to compensate for the initial expansion. It does not exhibit any further growth.

Table I shows analyses, melting temperatures,

A technique used by Ford Motor Co. for producing dies of Cerro-type alloys and chilling them to -320°F in liquid nitrogen to give them the hardness and abrasion resistance required for stamping sheet metal parts is described in this article. Up to 250 parts can be stamped before the dies need rechilling. Because of the ease with which the dies are formed, the technique provides an economical means of producing experimental stamped sheet parts.

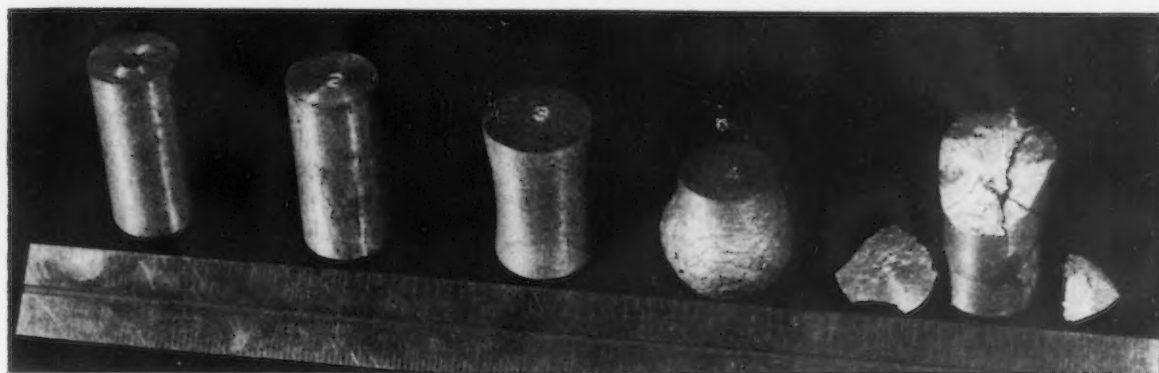


FIG. 2—Cerro-bend test specimens after various loadings. The loadings are shown in Table II.

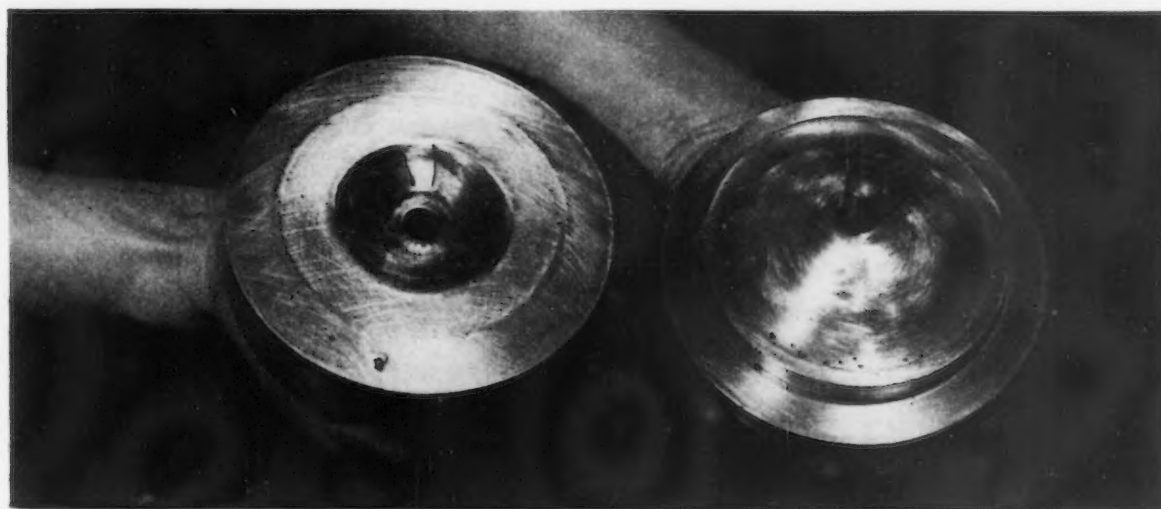


FIG. 3—While these experimental Cerrobend dies will melt in boiling water, after chilling they can withstand stamping pressures and produce up to 250 parts before rechilling is necessary.



FIG. 4—This is an experimental die arrangement for a simple stamping operation. Chilling not only gives the die added strength, but also wear resistance. Stampings made on this die are also shown.

freezing ranges, densities, and tensile properties of several low temperature melting Cerro-alloys. These characteristics are all at room temperature.

All of these alloys have excellent machining characteristics. They can be turned, milled, drilled or reamed without excessive gumming of the tool or other machining difficulties. Chips and used dies can be remelted and the dross skimmed off with only a small loss of metal.

Fig. 2 shows slugs 1 in. diam x 2 in. tested in compression in an Olsen machine. All tests were made at room temperature. Chilled specimens were transferred from the liquid nitrogen and the load applied in all cases in less than 3 min. Elapsed time between removal from the liquid nitrogen and completion of the test did not exceed 5 min in any case.

Because of the small diameter of the specimens tested and the relatively large unchilled area, cold dissipation during these tests is rapid. Where larger specimens are tested, the temperature rise of the die is much slower. The unusually slow heat transfer properties of Cerro-type metals is one of their outstanding properties. On compression tests made on Cerro-type alloys, the loadings of the test specimens are shown in Table II.

Making forming dies of this low temperature

melting type alloy is simple and surprisingly rapid. An actual part or a reproduction in metal, wood or plastic will serve for a pattern. The male die is always produced first. In some cases it has been found advantageous to turn or mill a Cerrobend male die. Where this procedure can be employed, considerable time is saved, and the excellent machining characteristics of the die material encourage the use of this technique.

After the male die is made, an aluminum spacer is put into place. If clearance for working is required, Plastine modeling clay may be used. The next step is to pour the female die with the spacer in place.

Several hours will be required to permit the die to cool to working temperature. The two sides of the die are then machined parallel and the die is ready for chilling in liquid nitrogen. Typical Cerrobend mating dies are shown in fig. 3.

Up to the present time all experimental parts made by Ford have been produced in an Olsen tensile machine but other equipment may be used if desired. Fig. 4 shows sample parts made by this method. The pressure applied to the die depends on the size of the die and the requirements of the material to be formed. Relatively high pressures may be used early in the run if precautions are taken to prevent a too rapid rise in temperature of the die. Asbestos sheet may be employed to retard heat gained by the die. Dies can be repaired quickly and satisfactorily using a soldering iron.

The use of these low melting type materials to produce short life dies is still in the experimental stage. Basic studies of the low-temperature properties of the materials are now being made. Experimental die runs have been limited to a few specific parts, but in each case where a part has been required—and required in a hurry—this unusual method of making temporary soft metal dies and chilling them to get necessary strength and hardness has been equal to the requirements of the service.

TABLE II
Test Specimen Loading

Bar No.	Actual Load, Lb	Estimated Load, Psi
1	0	0
2	5,650 *	7,200
3	7,500 **	9,800
4	5,650 ***	7,200
5	19,000 *	25,000

* Chilled.

** Partially chilled.

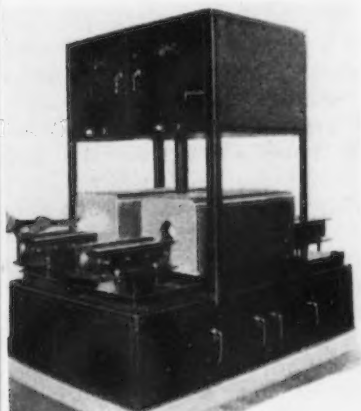
*** Not chilled.

New Equipment . . .

Induction bar heaters, a flash trimmer for butt-welded strip steel, a deburring machine for small parts, a hydraulic press, a small gas-fired oven furnace, and compressors are described this week. Material handling equipment, gear variable speed changers, a spray gun, and a die table are also included.

Induction Bar Heaters

TO reheat bars which have cooled too much during preliminary operations, *Ajax Electrothermic Corp.*, Trenton 5, N. J., has



brought out the Ajax-Northrup induction heater which is installed at the forging machine and is rated at one bar a minute. The heater is controlled by a foot switch. Bars 4 in. sq and up to 1 yd long are heated to the forging temperature in an ordinary fuel fired furnace and then are removed for a tong hold forging operation. The bars, which have cooled, are fed onto rollers to the high frequency induction furnace and are reheated on an automatically timed heating cycle. A typical unit has twin heating coils, each of which draws 125 kw of 960 cycle power. Power source is a 700 kw, 960 cycle, 400 v motor generator unit. One motor generator supplies power for two twin heaters, or four work stations.

Flash Trimmer

A HEAVY duty rolling mill flash trimmer has been designed by *Morton Mfg. Co.*, Muskegon Heights, Mich., for use in a continuous process rolling or pickling line. In welding butt ends of strip steel coils to form a continu-

ous strip, the push up or forging process creates an upset at the welded joint which must be removed before passing through the cold reducing mills. The flash trimmer which is placed in the line adjacent to the flash welder, is provided with power horizontal traverse for final alignment of the machine with the weld. This type machine, built in sizes to trim 38 to 120-in. wide sheets, is equipped with opposed clamping jaws which are mounted on the lower and upper housings. Shuttle type rams carrying a multiple number of cutting tools are supported in roller guides in both the housings. They travel in a path parallel to and a fixed distance from the clamping dies.



The tools are individually adjusted for depth of cut in relation to the clamping dies; hence the clamps contacting the strip automatically adjust the cutting tools for variation in gage or tolerance. Lifting rollers moving vertically with the motion of the upper housing, lift the strip clear of the dies during the rapid run-off periods.

Drill Press

A NNOUNCEMENT of a new drill press model, trade-named the *Infi-Speed*, has been made by *Canedy-Otto Mfg. Co.*, Chicago Heights, Ill. The machine offers an infinite range of speeds between 150 and 3400 rpm. This infinitely fine adjustment of spindle speeds allows for a more precise adjustment to the material being worked,

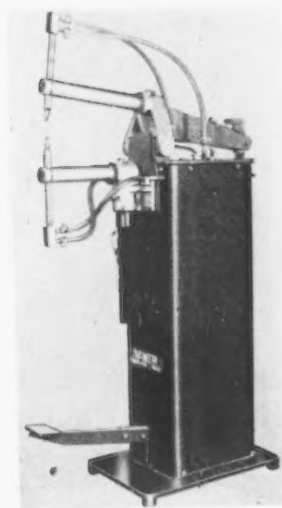
increases operating efficiency, and increases drill life, it is reported. The new unit is available with or without a 9-speed power feed.

Buffing Machine

AN electrically powered buffing and polishing machine geared to handle articles of nearly every shape and size has been announced by *Vanott Machine Corp.*, 228 Colgate Ave., Buffalo 20. The unit, type V-1, is fully adjustable for heights, angle spindle speed, and stroke which ranges up to 6 in. Chucks or holding devices are individually designed to hold the item being buffed or polished. All vital mechanism is enclosed to give protection from abrasive wear. A 1/2 hp motor provides power and can be plugged in at any convenient light socket.

Spot Welder

A FOOT operated spot welder of the pivot type is announced by *Agnew Electric Co.*, Milford, Mich. This is identified as Type J



and is furnished in 12, 18, and 24-in. throat depths with 10 kva transformer. A four point tap switch is provided with off position for

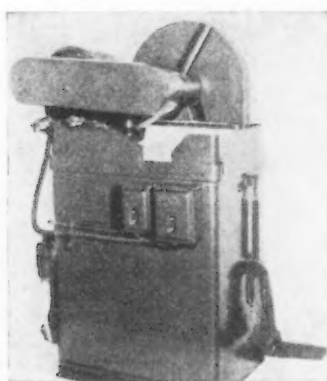
setup and a magnetic contactor and automatic switch for passing current after pressure is applied to the work. Upper and lower horns are adjustable and can be rotated. The lower horn can be swiveled and reversed. Machine is furnished for operation on single phase ac power supply of 220, 380, 440, or 550 v; 25, 50, or 60 cycle current.

Reciprocating Compressors

RECIPROCATING compressors ranging from 5 to 100 hp have been announced by *Carrier Corp.*, Syracuse, N. Y. The machines are designed for air conditioning or low temperature work and are half the size and about half the weight of their predecessors. To meet individual requirements, the compressors have been so constructed that they can be assembled in more than 1000 combinations, it is stated. Among the features listed are automatic load-free starting, automatic load levelers, external control of capacity, vapor cushioned valves and removable cylinder sleeves.

Cut-Off Machines

TWO abrasive cut-off machines; Model D-2 and Model W, illustrated, have been developed by *DoAll Co.*, Des Plaines, Ill. Model D-2 is described as a dry type machine using a 10-in. wheel mounted on a swinging arbor and is powered by a 3-hp motor. This unit is recommended primarily for use in toolroom and job shop work on hard

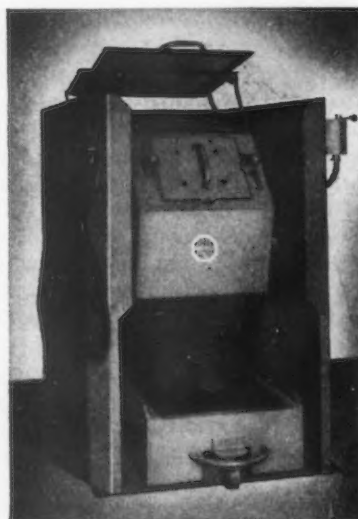


and soft materials. Model W is a larger machine which includes a coolant tank and pump for wet cutting. It uses a 16-in. wheel and is powered by a 7½-hp motor. It is recommended for production line work. Tolerances of 0.003 in. are claimed for this machine. Work vises operated by a foot pedal are

standard equipment. Also included are stop gages for cutting to length. Capacity of Model W is 3-in. tubing or shapes and 2-in. solid bars. Model D-2 will cut solids to 1 in. and tubing and shapes to 1½ in.

Deburring Machine

KNOWN as the CW-22-1 Model, a one compartment Roto-Finish machine for small mechanized deburring and finishing installations has been announced by the *Sturgis Products Co.*, Sturgis,



Mich. The one compartment cylinder has an ID of 19x32 in. and is lined with replaceable hardwood maple. The door is fitted with a rubber gasket held in place by cam locks. Standard equipment includes a forward and reversing switch with synchronized magnetic brake; water attachment with valve for adding water to the processing compartment; 1½ hp, 220-440 v, 60 cycle, 3 phase motor with gear reducer; and a swivel type, three point suspension hoist pan.

Automatic Welding Torch

AN automatic welding torch with a lever-operated built-in gas saver has been announced by *Liquid Carbonic Corp.*, 3100 S. Kedzie Ave., Chicago 23, for production work in rapid welding of small assemblies. The torch, when laid down while being used, goes out except for a small pilot flame. By depressing the lever when work is resumed, the operator has a welding flame ready for use without adjustment. The torch is known as the WA-54. Another model, WA-54-B, has a lever hold-down lock for continuous welding.

Air Controlled Valves

DEVELOPMENT of non-corrosive, full capacity, 3-way direct operating solenoid controlled valves has been announced by *Airmatic Valve, Inc.*, 1643 40th St., Cleveland. This high-speed solenoid valve eliminates pilots, levers, distributors and all other types of indirect control. Valves can be mounted in any position and can be operated continuously without harm to the valve or solenoid, it is stated. The solenoid is rated 1.42 amp inrush, 0.22 amp holding at 110 v, 60 cycles. Valves are furnished in four standard pipe sizes, ¼, ¾, 1½ and 2 in.

Gear Variable Speed Changers

ANNOUNCEMENT of the H-6 gear variable speed changers which are rated at 20 hp for speed variation ratios of 5 to 1 and 6 to 1, and 25 hp for speed change ratios of 2 to 1, 3 to 1 and 4 to 1, has been made by *Link-Belt Co.*, 307 N. Michigan Ave., Chicago 1. They are made in a plain, basic horizontal assembly with housing split horizontally. The housing consists of a top and bottom half, instead of the central housing and side plate construction employed on smaller gear sizes. Units are compact, all-metal, fully enclosed and self-lubricating.

Hydraulic Press

OF 20-ton capacity, a Smooth Line hydraulic laboratory press designed with double acting



ram providing positive pullback pressure for separating molds and dies, has been announced by *Hydraulic Press Mfg. Co.*, Mt. Gilead, Ohio. Pressing surfaces are 8 x 9 in.; maximum opening, 14 in.; maximum travel, 8 in. Direction

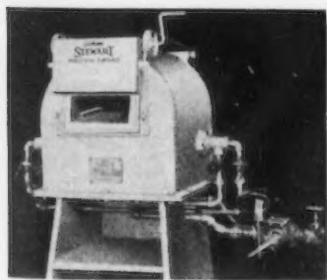
of travel is controlled by manually operated valve. The press platen is traversed to the work rapidly by gravity, the hand pump used only for building up desired pressure and returning press platen to original open position. The press is designed especially for pressure holding service over long periods of time. Attachments for slug briquetting, tension testing, compression testing, plastics injection molding of test bars, and hot plates for laminating and molding are available.

Oil Stand-by Equipment

DESIGNED for use in furnaces, ovens and other equipment using burners of Surface Combustion manufacture, where impending gas shortages may interfere with normal production, new oil stand-by equipment utilizing No. 3 furnace oil or lighter, and providing the same Btu input per hour as existing gas burners, is available from Surface Combustion Corp., Toledo 1. This stand-by equipment can be applied to virtually all SC burners, both low and high pressure, in capacities ranging from 70,000 to 3,500,000 Btu per hour, per burner. Oil pressure with No. 3 oil is 100 to 150 psig. Atomizing air pressure is 30 to 40 psig, with approximately 3 cfm of air required per gallon of oil burned per hour.

Small Oven Furnace

WITH a temperature range of 300° to 2400°F, a small semi-muffled gas fired oven furnace has been designed by Sunbeam-Stewart

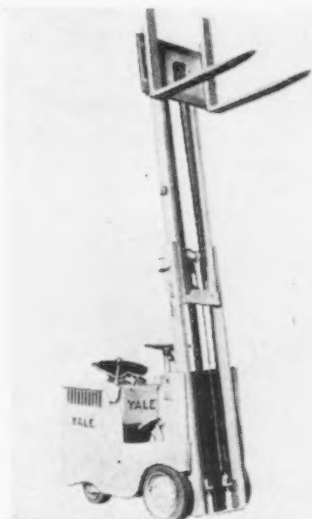


Industrial Furnace Div., Sunbeam Corp., 4405 Ogden Ave., Chicago 23. New type burners are said to permit a 95 pct turndown range of fuel. Uniformity at low temperatures is obtained by increasing air over gas ratio, thus heating by convection. Staggered position of the nozzle-mixing wide range burners

results in a circular turbulence throughout the heating chamber. The outer shell is constructed of steel and cast iron to eliminate the possibility of warpage at high temperatures. Seal-tite door maintains a constant seal between door and furnace proper. The furnace is available in the following sizes: 4x8x12 in.; 6x12x18 in.; and 9x15x12 in. heating space.

Lightweight Fork Trucks

KNOWN as the Zephyr line, new light-weight low-capacity electric tilting-fork trucks have been



announced by Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24. The new trucks are designed for transporting and tiering loads of 1000, 1500 and 2000 lb. Compact design and small overall dimensions, 58 in. long x 38 in. wide, make the trucks suitable for operation in congested areas. Basic principles of design include tilting mast, four forward and reverse speeds, spur-gear drive, sit-down control. Fork-lifting height is 127 in. and overall truck height, 83 in.

Air Regulating Valve

ANNOUNCEMENT of an automatic pressure regulating valve designed for service on compressed air supply lines has been made by Hannifin Corp., 1101 S. Kilbourn Ave., Chicago 24. Known as the Air Warden, the regulator is recommended for use on initial, or primary, air pressures up to 150 psi and can be set to maintain reduced, or secondary pressures ranging from 125 down to 5 psi. The valve features a free floating stem

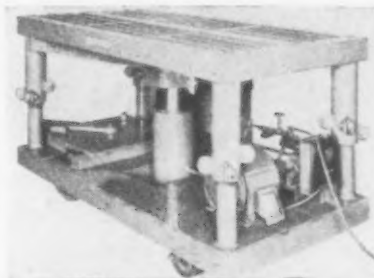
to back-off or reduce the delivered pressure under dead end conditions by turning the adjusting screw. This design feature is said to insure protection against pressure build-up under dead end conditions and contribute a stabilizing effect in handling sudden pressure changes. All parts are made of non-corrosive materials. The regulator is available in two models: Model RD-1 for 3/8 in. line piping and Model RD-2 for 1/2 in. connections.

Resistors

FOR continuous duty high current applications where mechanical shock and vibration prevail, Loopohm resistors have been developed by Ward Leonard Electric Co., Mt. Vernon, N. Y. The resistors are suited for use on welding equipment, crane hoists, portable load banks, and controller assemblies. Available with continuous current capacities from 20 to 110 amp and with a wide range of resistance values, the resistors consist of a channeled resistance alloy ribbon formed in a series of loops supported between two rods insulated with ceramic bushings and washers. The rods are bolted to pressed steel frames. Each unit is equipped with two end terminals for connection purposes. They feature high current capacity, and are adaptable to single or multi-unit mounting.

Die Table

FOR handling dies weighing up to 12 tons, a 24,000-lb capacity electric hydraulic Liftable has been developed by Service Caster & Truck Corp., Somerville, Mass.

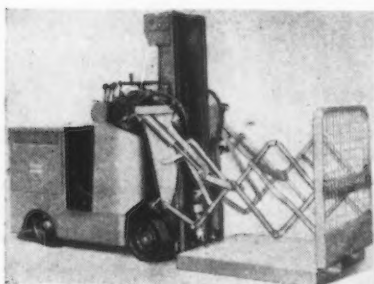


With rollers to discharge the load from either side, the 36 x 72-in. die table has a raised height of 40 in. Lowered height is 30 in. The hydraulic system is activated by a 1 1/2-hp motor and the table top is raised with a push button control while a hand valve controls the lowering. The 8-wheel running

gear of the Liftable includes four rigid casters and four 8-in. diam wheels on a fifth-wheel unit.

Pallet Retriever

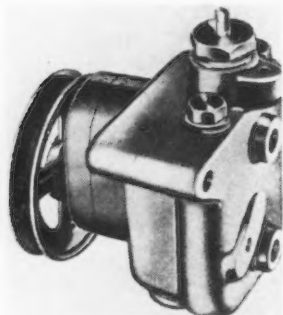
An accessory mechanism, compact and attachable to the forward or fork-end of a lift truck has been developed by *Elwell Parker Electric Co.*, Cleveland 14, for retrieving pallets. The load



handling or stabilizing device consists of two hydraulic actuated pantograph type rams which terminate in a screen frame which retains in a fixed position the load to be deposited. Rams are self-adjusting to fit and follow the contours and vertical or lateral motion of the unit load as the truck with the pallet backs away and withdraws the pallet from beneath the load.

Midget Power Unit

FOR use on such applications as harbor presses, hydraulic clamping vises, forming, straightening, and bending devices, pressure inserting equipment, in fact, for applications where push, pull, or lift



are functional requirements, a midget size hydraulic unit has been developed by *Hydraulic Press Mfg. Co.*, Springfield, Ohio. Called Ten-Ton-Tony, the unit measures 6x7x9 in. overall. It has a capacity of 3 gal of oil per min at 1200 rpm at 1000 psi or 4½ gpm at 1800 rpm at 1000 psi. It requires approximately 2½ hp to operate at 1200 rpm.

Collapsible Pallet Box

INTRODUCTION of a collapsible pallet box has been made by *Monroe Auto Equipment Co.*, Monroe, Mich. The collapsible pallet box utilizes a 40x48 in. pallet as a base and has 8-gage steel wire sides 24 in. in height which form a container for handling and shipping loose material. When not in use the wire sides fold down on the top of the pallet and form a unit 7½ in. in depth. The unit is available with a heavy pallet weighing 96 lb or a lighter pallet weighing 69 lb. Pallet is made of high tensile steel in corrugated, crimped design. Capacities range from 2500 to 5000 lb in single loads and 15,000 to 35,000 lb in tiered loads.

Anti-Corrosive Coating

ZINCILATE coatings, manufactured by *Industrial Metal Protectives, Inc.*, Dayton 2, are anti-corrosive types and will air-dry without baking. The coatings are said to be sufficiently flexible that sheets, pipes and forms can be bent double after coating, without breaking the protective coating. Overcoatings of enamel, paint or wrinkle finishes may be applied over Zincilate after 5 min of air drying, and both coatings baked at the same time. Zincilate is adaptable to production line application by dipping, spraying, brushing or roller coating, with conventional finishing equipment.

Pipe Joint Compound

A LARGE-DIAMETER stick of a pipe joint called Jumbo Pipe-tite-Stik, for larger threaded pipe has been announced by *Lake Chemical Co.*, 607 N. Western Ave., Chicago. Available in stick form, and used by rubbing several strikes of the stick across the pipe threads, it lubricates and completely seals pipe joint threads, nuts, bolts, gaskets, etc. It withstands vibration, temperature changes deflection, and pressure, and is said to prevent rusting.

Light Metal Wire Spool

MADE for the spooling of magnet wire and similar extremely fine wires, a light metal alloy shipping and limited process spool has been offered by *Hubbard Spool Co.*, 1622 W. Carroll Ave., Chicago 12. The spools are precision made and balanced, it is

stated, and built with sectional thicknesses sufficient for all operating strength requirements. Use of light metal alloy provides weight reduction as well as eliminating rust problems.

Spray Gun

A PAINT spray gun, the Micro-Spray, introduced by *Kellogg Div.*, *American Brake Shoe Co.*, 97



Humboldt St., Rochester 9, N. Y., is said to produce smoother finish through more uniform flow of air and paint. Detrimental effects from air pressure drop and eddy currents are said to have been eliminated. The entire head may be removed as a unit. One fluid needle is used for all paint spraying. The needle is a self-aligning cartridge type. Three spray heads cover the range of paint spray materials.

Bottle Oiler

An unbreakable, automatic oiler, specially designed for places where space between oil hole and machinery is very limited, has been announced by *Trico Fuse Mfg. Co.*, 2948 N. 5th St., Milwaukee 12. The feed spout is arranged to the side, making it possible to mount the oiler where clearance is as little as ¾ in. The oiler automatically lubricates solid, wick, or waste-packed bearings. The rod rides on the rotating shaft and the slightest vibration or vertical movement releases the oil from the plastic bottle. The oil supply is always visible. It is made in 1, 2, and 4 oz capacities, has a ⅜-in. pipe thread adapter.



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Assembly Line

WALTER G. PATTON

• Gas shortage continues to hamper auto production . . . Ford's new Lincoln-Mercury Div. is aiming at 250,000 cars in 1948 . . . UAW-CIO holds its own prize contest . . . Playboy car displayed.



DETROIT—Sources close to the automotive industry have about given up hope of producing more than 300,000 cars in February. *Automotive News* has estimated that 76,894 cars and trucks were assembled in U. S. and Canada last week, bringing the mid-month February total to approximately 160,000 units. With another cold wave reported on the way and the Chevrolet Gear and Axle Div. pulling down all Chevrolet assembly plants with it, most sources considered 70,000 units per week a fair estimate for the two weeks remaining in the month.

So far this month the industrial gas shortage has cost the auto industry an estimated 75,000 to 100,000 units, and it now appears that this loss may be doubled before a favorable break in the weather permits resumption of full operating schedules. Then, auto executives say, "We'll have little to worry about except steel shortages, labor negotiations and John Lewis."

At the moment only Dodge truck of all the Chrysler Div. in Detroit is operating. Packard and Federal Truck are closed. Ford's Highland Park Truck plant is limping along on a reduced schedule. At the moment there is some hope that

assembly plants now closed down will resume operations the middle of this week.

* * *

THE other top half of the Ford team—Benson—held his first press conference this week to make public for the first time the ambitious aims and aspirations of Lincoln-Mercury Div. of Ford.

Lincoln-Mercury has set for itself a goal of "continued penetration of the medium and high-priced market until leadership in this market is achieved." This Lincoln hopes to do with its brand new Mercury and two new Lincoln models.

AS now constituted, Lincoln-Mercury is an almost autonomous unit of Ford operations. Except for assembling its Detroit-built cars and handling its top labor relations at the Rouge, the Lincoln Div. is now, for all practical purposes, "on its own," with Benson Ford at the helm.

Lincoln-Mercury which once tagged on apologetically to Ford dealer's shirt-tails is setting up its own dealerships as rapidly as possible. According to Benson Ford, there are now 1061 Lincoln-Mercury dealers and the company hopes to increase this to 1600 by next year. At present, there are 154,000 unfilled Mercury orders, compared with 157,000 in January 1947.

Joseph W. Bayne, general sales manager, explained that Lincoln is constantly working to squeeze the water out of its order books and believes most of these orders are fundamentally sound. If so, the orders on hand represent slightly more than the 1947 Mercury production of 153,000 cars.

Lincoln-Mercury like Ford has invested heavily in its brand new 1949 models scheduled for public introduction during April. Plant improvements, including an extensively revamped assembly line, have cost \$25 million. An additional \$50 million has been invested in new tools, dies, jigs and other equipment. In contrast to previous practice, the new Mercury models are said to be completely "different" from the new Ford, although there will undoubtedly be interchangeability of a number of parts.

Three new assembly plants—in

Metuchen, N. J., St. Louis and Los Angeles—will produce the new Mercury. Including the Detroit plants, 12,000 workers will be employed.

* * *

CONVERSION of the giant Ford Rouge plant for production of 1949 Mercury and Ford models gets under way this week. The Mercury line will go down first, necessitating an undetermined number of layoffs while new machinery is moved into place, new dies are set and jigs and fixtures are tried out.

Pilot models of the Mercury will begin coming down the assembly lines almost immediately with the pace being stepped up as fast as the "kinks" in the line are ironed out. After the Mercury line is going, the changeover of present Ford models will begin, necessitating further layoffs. Then begins a renewed struggle on a huge scale to make the plant ready for the new Fords.

According to union officials most of the layoffs will center in the Ford "B," Axle and Press Steel Buildings. Union officials estimate that 7000 workers will be laid off but company officials emphasize that the extent of the layoffs cannot be fully determined until plant changes are actually made. While it is true that many workers will be idle when full production on the assembly lines is stopped, many of these workers, it is expected, will be transferred temporarily to other occupations. Also, the Ford assembly plants may be only slightly affected since it is expected that much of the slack caused by interruption of passenger car lines will be taken up by increasing truck output.

The Mercury will make its public appearance early in April and the Lincoln will follow later the same month. Most sources believe that June will be the earliest possible introduction date for the new Ford model.

* * *

KAISER-FRAZER has adopted a new plan for handling grievances arising from time standards. Until recently, grievances of this type were handled through the

The WHEELABRATOR cleans Pipe fittings and Plumbing Equipment faster at less cost

The chart below shows a case-history comparison of the time needed for cleaning typical loads of pipe fittings and plumbing parts by various cleaning methods.

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MATERIAL CLEANED	WHEELABRATOR CLEANING TIME	FORMER CLEANING TIME
● Standard Tees 1000 lbs.	4 minutes	25 minutes (Airblast Cabinet)
● Faucets 250 lbs.	5 minutes	16 minutes (Tumbling Mills)
● Elbows 1000 lbs.	4 minutes	25 minutes (Airblast Cabinet)
● Soil Pipe — 1200 lbs.	8 minutes	30 minutes (Tumbling Mills)
● Pipe Fittings 1000 lbs.	6 minutes	25 to 30 minutes (Tumbling Mills)
● Couplers 300 lbs.	4 minutes	45 minutes (Water Tumblers)
● Meter mountings 60 lbs.	5 minutes	30 minutes (Airblast Cabinet)
● Mixing valves 250 lbs.	7 minutes	12 minutes (Tumbling Mills)

PARTIAL LIST OF PARTS CLEANED

Faucets
Strainers
Pipe plugs
Pipe caps
Union Nuts
Union tees
Brazed fittings
Flanges
Traps
Yokes
Valve handles
Tail pipes
Trap lock nuts
Nose couplers
Elbows

Tees
Mixing Valves
Soil pipe
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Bushings
Spigots
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normal grievance procedure, beginning with negotiations between departmental union stewards, foremen and labor relations representatives. Recently K-F induced the union to accept a proposal for training its time study stewards. It was agreed that candidates for the jobs should be selected on the basis of aptitude tests to be supervised by the Detroit Board of Education. Eighty-four union members applied for the job which carries the same pay rate K-F time study men receive.

Under the new plan the K-F time study department continues to establish standards. Where a dispute arises the union time study stewards enter the picture. The new K-F practice will be watched with interest by Detroit labor relations men who have found alleged speed-ups and slowdowns a fertile source of disputes between labor and management.

* * *

FOLLOWING close on the heels of the recent General Motors' "My Job Contest" the UAW-CIO is holding a prize contest of its own for the purpose of increasing its membership. In the contest blanks being sent to members, a card is enclosed which entitles the member to an additional vote for each new member he signs up. Behind the membership drive, the union admits, is the desire to strengthen its position at GM and ultimately to win a union shop. All indications point to a goal line stand by GM to resist this demand.

This week Chevrolet will open a new assembly plant, having a capacity of 400 cars and trucks a day, at Van Nuys, Calif. The plant will be Chevrolet's eleventh assembly unit.

* * *

PLAYBOY CAR CORP., Buffalo, invaded Detroit this week with a 4-cylinder, 3-passenger single seat car featuring an all-steel convertible top. The Playboy is expected to sell at less than \$1000, a price field which established car producers have consistently ignored.

Both General Motors and Ford have made extensive and costly investigations of this market and have scrapped their plans for light cars for the present at least.

The exhibition held for the purpose of attracting prospective dealers and showing the car to the press drew 17,000 observers over a 5-day period. For the most part, com-

ment on the new car has been favorable.

According to Playboy Corp. engineers, 30 miles per gal have been obtained in open road tests when the car powered by a 40 hp Continental engine is driven at speeds of 45 mph and under. In city driving tests the car is said to give 25 miles per gal or better. Top speed is 65 mph using the present power plant. Some consideration is being given to increasing the hp to 48 from the present 40.

Overall length of the Playboy is 155 in. and the wheelbase is 90 in.

The unique all-steel disappearing top featured by the Playboy undoubtedly offers some interesting possibilities and is the first of its kind offered for mass production. With the top up the car becomes, for all practical purposes, a coupe and extra space is available behind the driver for luggage or a couple of small youngsters. However, within 30 sec the top can be lowered converting the car into a roadster.

The car also features an integral body and frame welded into a single unit, the type of construction being used by Nash and Hudson. It has independent front suspension on 4 wheels, airplane type, hydraulic

shock absorbers and hydraulic brakes.

Playboy engineers explained that standard parts are being used throughout the car including a Carter carburetor, Warner transmission and Electric Auto-Lite ignition. Tires are a standard size used in agricultural implements.

Up to the present time the company has produced 18 cars at Buffalo in the plant used during the war by Chevrolet Motor Div. of General Motors for the assembly and testing of Pratt and Whitney aircraft engines. A tooling program is said to be under way calling for production late this year. Using two shifts in the press room and one shift on the assembly line, Playboy is aiming at a production rate of 100,000 cars annually.

A spokesman for the company declined to comment on prospects for obtaining steel for the pilot production program which calls for a total of 500 cars. This program is expected to be merged into mass assembly when tooling is completed. Sales to the public will start at the year's end, it is stated.

At present, Playboy is occupying the Buffalo plant as a tenant of the WAA. Necessary financing has not yet been arranged, it was stated.

Used Car Prices Sag But Dealers Expect Upsurge Next Spring

Detroit

• • • Used car prices in this area are tobogganing, but car dealers hastily inform their customers that prices are going to bounce back again this spring.

"Used car prices have always been noticeably higher in the spring," one Detroit dealer told THE IRON AGE, "and I see no reason why the present downward trend will not be reversed starting in March or April."

A chart recently compiled by a Detroit economist showed that 1947 Chevrolets, Fords and Plymouths were selling last August for about \$2200; today the average price shown in the classified ads in 10 large U. S. cities is less than \$2000. Last August the same kind of curve for 1946 models showed an average price of over \$1800; the average price for December 1947 is about \$1650.

While used car prices for Ford, Chevrolet and Plymouth are fall-

ing off, 1947 models on used car lots are still selling at \$500 more than the manufacturers' "suggested price," while 1946 models continue to bring about \$150 premium.

The drop in the price of 1947's medium-priced cars on used car lots is even sharper, falling from about \$2700 last July to \$2367 at the end of December. The present average price of 1947 cars on used car lots is about \$465 above the manufacturers' "recommended" price. The 1946 models in this price class are bringing a premium of only about \$100, according to this Detroit source.

Looking back into the historical pattern the used car prices in the same chart showed that the price level of used cars rose appreciably last spring. Between the end of February 1947 and July of last year, the average price of Fords, Chevrolets and Plymouths on used car lots in 10 major U. S. cities advanced from about \$1700 to almost \$1900. There was a similar rate of increase in the price tags of medium-priced cars on the nation's car lots.

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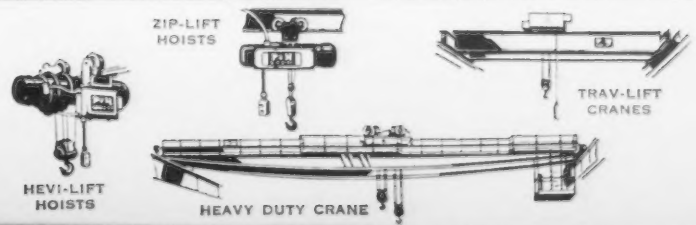
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Washington . . .

EUGENE J. HARDY

• Congress watching voluntary allocations . . . Not concerned over lack of progress . . . Political motives discounted . . . Bureaucrats held responsible . . . Not more than 3 million ton drain on steel.



WASHINGTON—The spectacle of Administration planners trying to inflate the new voluntary allocations law into something which will take longer to liquidate than to establish is really something to behold.

It has been almost 2 months since the President signed the law and delegated authority for carrying out agreements affecting most industrial commodities to the Commerce Dept. In this 2-month period practically nothing has happened. Steel industry leaders have met twice with the Commerce Dept. and have yet to be presented with a program for allocating steel to the critical areas outlined by Secretary Harriman.

Some of the delay has been ascribed in various quarters to political motives on the part of Secretary Harriman, who in backing President Truman, piously pleads for compulsory controls. The theory here is that Mr. Harriman could insure the failure of the Republican-sponsored measure and then demand compulsory controls before Congress adjourns this summer.

Actually, this theory does not hold much water. Mr. Harriman, despite his disinterestedness in

most domestic affairs, is wise enough to know that Congress is not going to grant any WPB or OPA-type powers at the present session.

In fact, most Republican leaders were caught off guard by Senator Taft's resurrection of the bill which had been killed by the House. In the interests of party harmony the House okayed the bill in the dying days of the special session after Senator Taft had jammed it through the Senate. House leaders are not particularly concerned with the success or failure of the voluntary allocations. Rep. Wolcott, R., Mich., chairman of the House Banking Committee, which has the responsibility for economic control legislation, reiterated this view to THE IRON AGE within recent weeks.

IF POLITICAL motives are not behind the snail-like pace of the voluntary allocations program, what then are the reasons?

At the present time, they appear to be: (1) the fumbling way in which bureaucracy moves, and (2) the complex character of the American economy, which makes agreement among certain industries a will-o-the-wisp objective.

On the first point, the facts are clear and can be backed up with substantial evidence. For example, in mid-December — before the President had signed the bill—officials of the Commerce Dept., assuming that they would be given the authority in regard to industrial commodities, worked out a tentative program involving the allocation of increased supplies of steel for freight cars, agricultural equipment, farm equipment, and possibly selected building materials. This was before Mr. Harriman was sold the bright idea of creating the new Office of Industry Cooperation. While this new office did not kill the original program, the administrative planners, who would have a hard time getting their finger into the established bureaus of the department, decided that this limited program was in need of all the bureaucratic embellishments.

They really went to town. The

result has been a profusion of industry committees, industry subcommittees, labor committees, an organizational chart that would really stop traffic, and, in general, a lot of square pegs in round holes. It is a familiar pattern which should not bother the steel industry executives who have come to Washington to protect their interests, for most of these men learned how to cut through this overpowering mass of red tape during their service with WPB.

THE organizational chart is a lulu. If the pipe connecting the boxes on this chart could be transformed into steel pipe, part of the worries of the petroleum industry would dissolve. But it must be remembered that this is the planner's last hope, for soon it will be too late to sell the public on the controlled-economy which the war had almost fastened on the United States.

On the other point, Commerce has found that it is going to be difficult to secure complete voluntary agreement in large industries where one non-cooperator could upset the wagon. The farm equipment industry, in its first meeting with Commerce, was skeptical of the whole program and outlined the above problem very clearly. One farm equipment producer stated that he was now getting 65 pct more steel than he had been able to obtain a year ago and was quite happy.

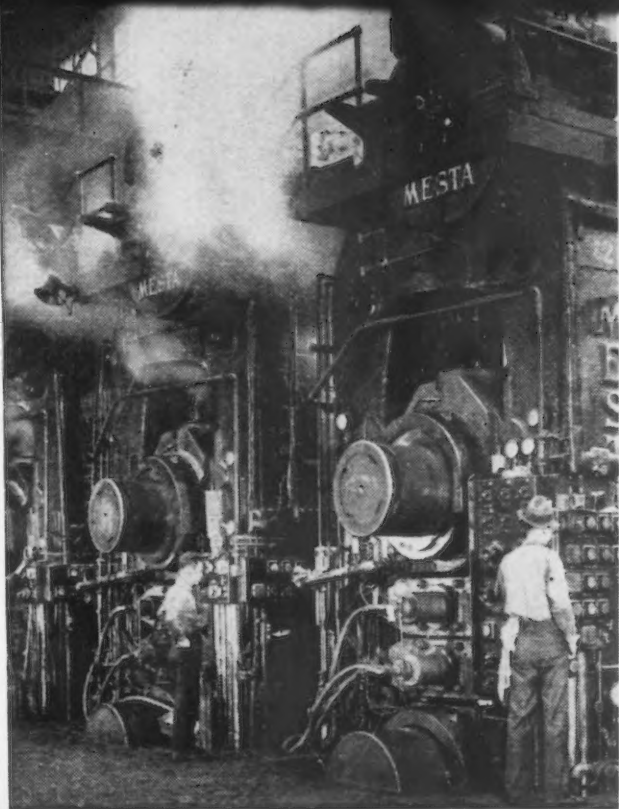
At the other end of the scale was a small factory owner whose primary business was repair and rebuilding of farm equipment. His steel requirements were measured in hundredweights rather than tons, but still he was unable to obtain adequate supplies. Obviously, differences of this type are going to be hard to reconcile in a completely voluntary program. The pig iron allocation program, now in the planning stages, will encounter similar difficulties because of the diversity of the foundry industry.

Another factor which is causing some hesitation on the part of industry is the feeling that the anti-

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trust immunity decreed by Attorney General Clark, as sanctioned in the law, is not all it should be.

HOWEVER, once the administrative planners, most of whom were brought into Commerce by Henry Wallace, have had their day and the program is thoroughly shaken down some allocations will get under way. First on the department's list is a program to keep steel production high by aiding in the procurement of scrap, improving supplies of coking coal, urging increased use of oxygen, and other similar measures. It is felt that by so doing most of the additional steel which will be allocated to production of freight cars, farm equipment, petroleum equipment, and housing can be obtained from increased production without much harm to other consumers.

The department confidently expects an increase in steel output this year of a minimum of 2,000,000 product tons. If additional scrap is made available and other dampening factors take a turn for the better, the increase will probably be greater, according to Commerce.

Finally, the department fully realizes that the steel industry is in the saddle in regard to the voluntary program as presently planned. If the steel industry can't—or won't—make voluntary agreements work, the department feels that the whole program is doomed to failure, since steel is the most compact industry with which the department expects to work out voluntary agreements.

Pig Iron Committees Study Requirements Of Car Manufacture

Washington

••• Two new government-industry committees this week are discussing proposals for dividing up the nation's pig iron output under the Taft-Wolcott voluntary allocations law.

One of the new groups appointed by Commerce Secretary Harriman has been assigned the job of advising the Office of Industry Cooperation with respect to supplies of pig iron for freight car production.

The other, a small task commit-

tee drawn from the larger group of producers, will work with the Office of Defense Transportation in allocating pig iron supplies among car building shops. This group will work closely with ODT's task committees of steel producers and car builders.

Best guess on the amount of time required for formalizing a program of pig iron allocation for the car building industry is from 2 to 4 weeks, according to top officials of ODT and OIC. After an agreement is reached for the car building industry, the new advisory committee will turn its attention to similar programs for the farm machinery industry and other pig iron-consuming areas.

Members of the pig iron advisory committee are:

John T. Whiting, Alan Wood Iron & Steel Co.; L. T. Johnston, American Rolling Mill Co.; F. J. Woodburn, American Steel & Wire Co.; C. F. Hocker, Bethlehem Steel Co.; H. M. Wilson, Chenango Furnace Co.; E. C. Thompson, Colorado Fuel & Iron Corp.; A. T. Galbraith, Crucible Steel Co.; Ward Coburn, E. & G. Brook Iron Co.; E. A. Jones, Globe Iron Co.; William Kerber, Hanna Furnace Corp.; Arthur G. Engh, Inland Steel Corp.; A. J. Haslett, Jones & Laughlin Steel Corp.; Chad Calhoun, Kaiser Co., Inc.; Donald McArthur, Koppers Co.; E. B. Germany, Lone Star Steel Co.; R. T. Tibolt, Mystic Iron Works; George W. Streibing, Pickands Mather; W. E. Scott, Pittsburgh Coke & Chemical Co.; A. R. Maxwell, Pittsburgh Steel Co.; D. D. Cooper, Portsmouth Steel Co.; Claude Schmdle, Republic Steel Corp.; G. F. Griffith, Sharon Steel Corp.; Charles S. Northern, Jr., Birmingham, Ala.; B. S. Stevenson, Tonawanda Iron Co.; John Neudorfer, Wheeling Steel Co.; Harry O. Bercher, Wisconsin Steel Co.; J. B. DeWolf, Woodward Iron Co.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



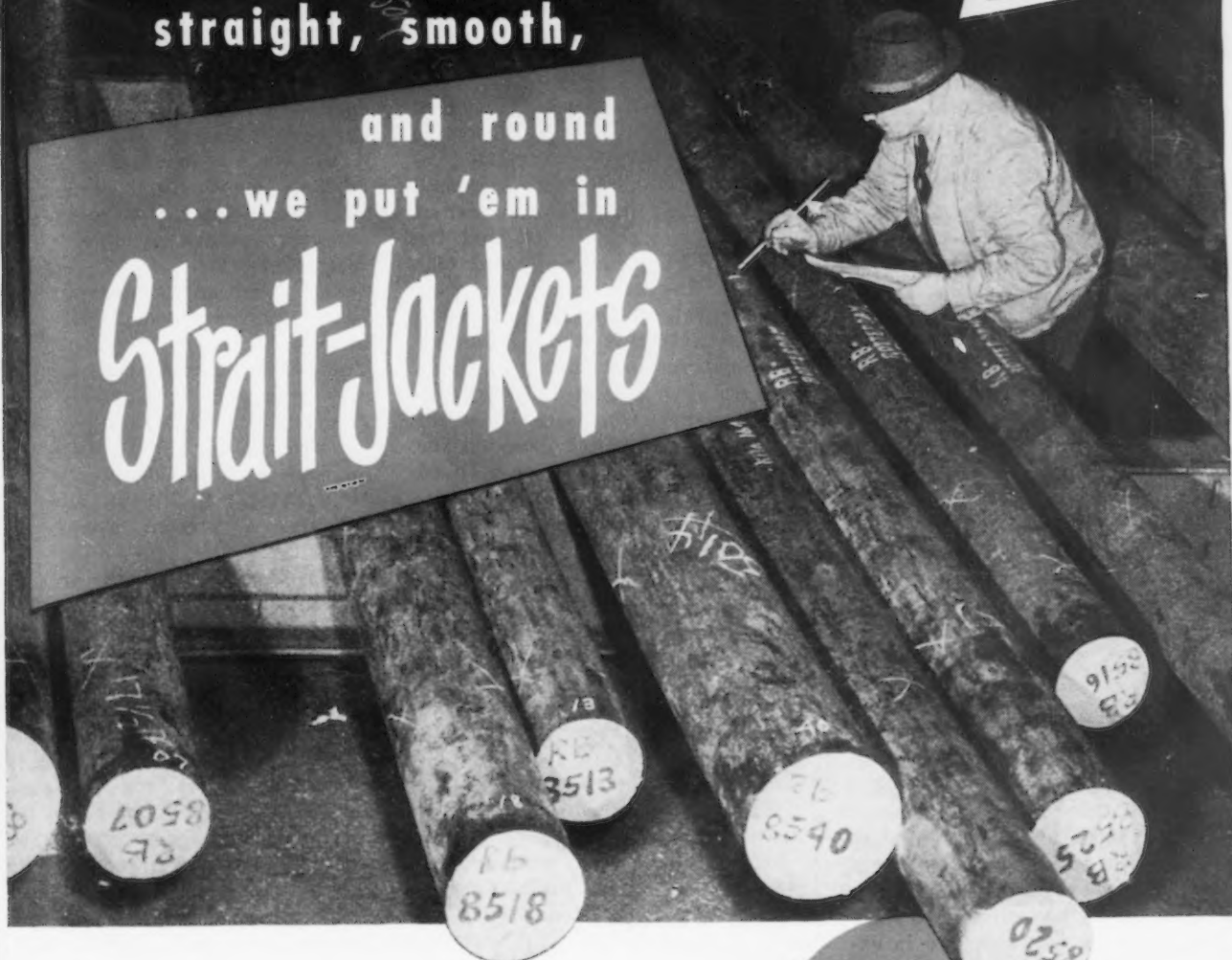
Earlier in the week, Mr. Harriman announced he had consulted with labor representatives in an effort to obtain AFL and CIO views on the new voluntary agreements programs, authorized by Public Law 395.

Mr. Harriman said he intended to supply the labor organizations with information on the new programs as they develop. The labor representatives, he added, agreed in turn to submit their views on the proposed programs.

In addition to Mr. Harriman, the Commerce Dept. was represented by:

John C. Virden, OIC director; William C. Foster, undersecretary; David Bruce, assistant secretary; Horace G. Reed, chief legal adviser; Ralph D. Hetzel, Jr., and David Lasser. Labor representatives at the meeting were: Otis Brubaker, research director, United Steelworkers of America, CIO; William C. O'Neill, United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the U. S. and Canada; Stanley H. Rittenberg, assistant director of research, CIO; Peter Henle, economist, AFL; George W. Brooks, research director, International Brotherhood of Pulp, Sulphite and Paper Mill Workers, AFL; George Delaney, international representative, International Molders and Foundry Workers Union, AFL; and William Dameron, of the International Association of Machinists.

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and round
... we put 'em in
Strait-Jackets



The above picture of Barium forged rounds is un-retouched. Contour dies insure a smooth, round product.

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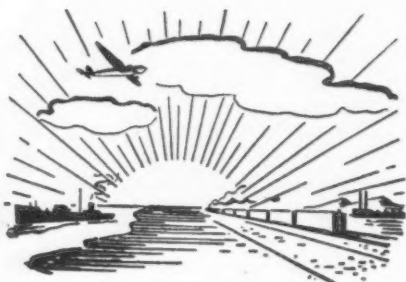
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• Southern California metal trades industries report breakdown of wage increases in five fields shows them to be in excess of cost-of-living increases since 1937-39.



LOS ANGELES—With a weather eye on the storm signals being raised by the CIO which warn of a third round of wage increases, the Metal Trades Manufacturers Assn. of Southern California has released a report on wage rates and cost of living designed to show that increases in wages are in excess of the increased cost of living.

Manufacturers of all types in Southern California have long contended that they are burdened with wage rates far in excess of those prevailing in other parts of the country and that under such conditions the future of industry here is in jeopardy. It is understood that the metal trades industry is particularly hard hit in this inequality of wages as opposed to other areas in the country and consequently leaders in this field indicate there is serious doubt that continued employment can be sustained against competition. Aircraft and shipbuilding industries are outstanding examples of those operations carrying a higher wage scale than competitors elsewhere.

However, the Metal Trades Assn. has confined its study to only five classifications and in considerable detail sets forth relative wage scales in comparison to cost of living for the past seven years with a

base established between 1937 and 1939.

Briefly, this report indicates that the average hourly wage rates in the metal trades industries of Southern California have increased 21 pct more than has the cost of living. It is pointed out that the cost of living has increased 61.3 pct and the average hourly wage rates have gone up 82.3 pct.

In making this study, the Association points out that the American working man is understood to be the person who earns his livelihood on the foundry floor, on the machine, at the bench, or high on the erection scaffold. In the tabulations which follow, the low salaried worker and public servant are excluded.

In the all-inclusive term, "the cost of living," as used in the study, reference is being made to all items in the "Consumers' Price Index," of the Bureau of Labor Statistics, U. S. Dept. of Labor. None of the single items such as food, rent or fuel are separately identified.

In presenting the wage earner's income, a composite figure representing all production workers employed on an hourly basis is used. It is pointed out that distortion of the facts would result if only a molder, a machine operator, a shake-out man or a patternmaker were used instead of the entire field of production workers in all classifications.

The period of 1937-39 inclusive has been selected as the basis on which to begin a comparison of average hourly wage rates and cost of living. This base period is represented by a figure of 100 which is known as the base index.

In all instances the latest hourly wage rates and cost of living figures are given as of October, 1947.

THE greatest consistent increases in overall hourly wage rates between the base period and October, 1947, are credited to the gray iron foundry industry. The average rate for all classifications was \$0.664 per hour in 1937-39 while the average as of October, 1947, reached \$1.282. This is an increase of \$0.618 per hour or 96.1 pct.

On this basis it is shown that gray iron foundry wage rates have increased 34.8 pct more than has the cost of living.

The wage rates during the 1937-39 base period of wage earners in gray iron foundries were reported as: chippers and grinders, \$0.59; coremakers, hand, \$0.83; molders, bench, hand and squeezer, \$0.81; patternmakers, wood, \$0.94; sandmixers, hand and machine, \$0.56. The average for all classifications of wage earners in gray iron foundries was \$0.664.

October, 1947, hourly rates for the same classifications were \$1.17; \$1.46; \$1.49; \$1.73; \$1.13, which indicates a present average of \$1.282.

Nonferrous foundries are reported as being second only to gray iron foundries in paying increases to wage earners which amount to 85.6 pct over the base period.

The increase in this industry has amounted to \$0.588 per hour, 24.3 pct more than the cost of living.

The base rates for the same classifications as given above for gray iron foundries during the 1937-39 period were: \$0.57; \$0.92; \$0.90; \$0.94; \$0.65, which indicates an average for all classifications of \$0.687. Hourly rates during October, 1947, in the same sequence and for the same work were: \$1.14; \$1.42; \$1.40; \$1.81; \$1.17. This gives an average rate of \$1.275, and indicates an increase over the base period of 85.6 pct.

Steel foundries hold third place in percentage increases in overall average hourly wage rates with a reported increase of 23.6 pct over and above the increase in cost of living.

The hourly rates paid during the 1937-39 base period are given as: chippers and grinders, \$0.68; coremakers, hand, \$1.01; molders, floor, \$1.04; patternmakers, wood, \$1.01; and sandmixers, hand and machine, \$0.63. The average for all classifications in this industry is given as \$0.724. In the same wage classifications as just given, hourly rates for October, 1947, are reported as: \$1.26; \$1.51; \$1.55; \$2.16; \$1.23. This is an average hourly rate for all the given occupations of \$1.339.

Wages in the oil tool and machine



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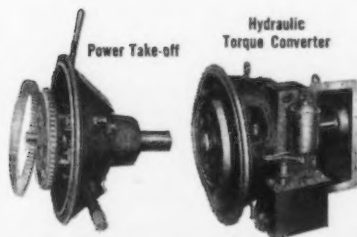
When the puck sizzles through a struggling mass of players...straight and swift toward the goal...the man in the cage must see it...and stop it...whether the puck is screened or in the clear. The goal-tender in professional hockey is a master at absorbing the shocks of surging power drives...a specialist in making "saves".

Saving powered equipment from critical strains and destructive shocks is a function of the various hydraulic drives manufactured by the Twin Disc Clutch Company. Guarding machinery—or the goal—calls for the same full combina-

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shop industry have increased on the average of \$0.604 per hour between the base period and October, 1947, which gives an increase of 75.9 pct. The average during the base period was \$0.795 per hour and in October 1947, it was \$1.399. These rates indicate an increase of 14.6 pct over the cost of living.

STRUCTURAL steel workers continue to receive the highest hourly rate in the industry, presently receiving an average of \$1.442. This same distinction held true in the base period of 1937-39 when the average hourly rate was \$0.83. This increase in average hourly rate of 73.7 pct indicates an increase of 12.4 pct greater than the increase in the cost of living.

Broken down by classifications, the average hourly wage rates in the base period were: fitters, structural, \$.91; layout men, \$.93; painters, spray, \$.67; and welders, hand, \$.95. This is an average for all classifications of \$.83. The same classifications received in October, 1947, the following hourly rates: \$1.52; \$1.60; \$1.35; \$1.55. This gives the October hourly rate of \$1.442.

In summarizing its findings, the Metal Trades Mfrs. Assn. of

Southern California states that the average hourly wage rate for all jobs in all metal trades industries in the Los Angeles area was \$1.378 as of October, 1947, which was an increase of 82.3 pct since the 1937-39 base period. It is pointed out that the "Consumers' Price Index," released by the U. S. Dept. of Labor

in December, 1947, shows "all items" (cost of living) at 161.3 on October 15, 1947, which is an increase of 61.3 pct.

The conclusion is drawn that the average hourly wage rate in metal trades manufacturing in this area has increased 21 pct more than has the cost of living.

Chesapeake & Ohio Improving Yards At Russell, Kentucky

Cleveland

• • • Chesapeake & Ohio Railway Co. has undertaken a \$2,312,350 expansion and improvement program of its Russell, Ky., yards. The project, to cost \$834,000, includes extension of present truck shop, smith shop, outside crane runway and storehouse, together with construction of a template storage building, a locker building, storage platform and machine foundations.

New machines and overhead traveling cranes have been installed. Machinery includes shears, punching machines, forging machines, furnaces, presses, lift trucks and related equipment.

Of the approximately 2 million freight cars dispatched from Russell, Ky., during 1947, it was necessary to repair in the Russell Yards 128,000 cars owned by C & O and other lines. Recently, the Russell car shops completely built 10 experimental aluminum boxcars and 5 aluminum test hoppers from the trucks up.

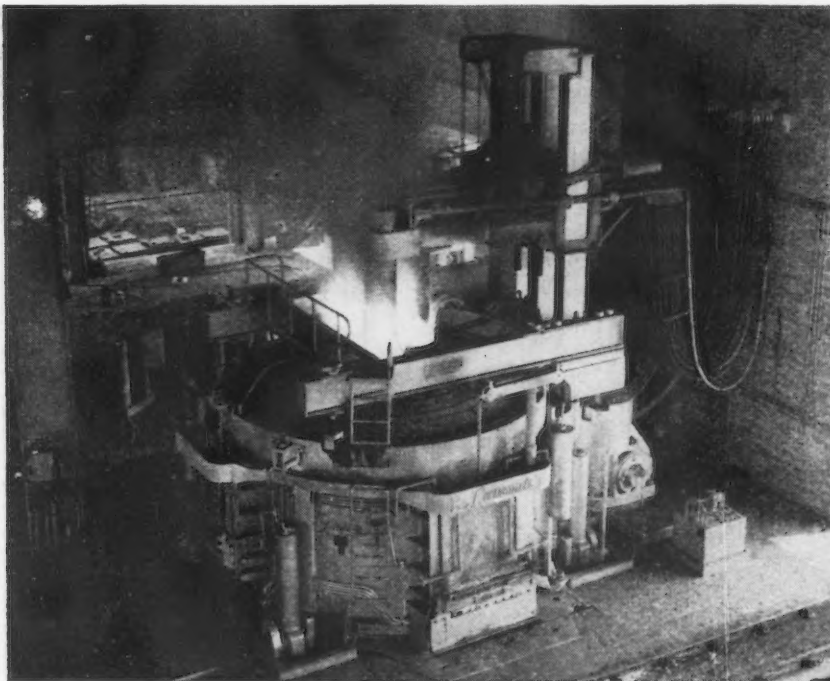
To handle larger volumes of work in the yards, the C & O is spending \$244,700 in rearranging the repair yards. This will permit better movement of bad order cars with least amount of interference to other work and provide additional repair pits and increased wheel storage space.

A number of short turnouts are being replaced with long turnouts which will increase the rate of speed at which trains may enter and leave the yards. This improvement will tend to minimize maintenance and derailments. This program will cost approximately \$53,600 and is about one-third finished.

Increases in weight, wheelbase and overall length of locomotives has necessitated a change in size of the engine house turntable. C & O is purchasing a 130-ft table and related equipment to cost \$236,900. The 130-ft turntable will replace a 115-ft table now in use at one of the engine houses. The 115-ft table will replace a 100-ft table at a second, thereby giving the engine houses increased and more adequate facilities for dispatching locomotives.

One roundhouse will be lengthened 15 ft and the pits extended in all 14 stalls. Another locomotive hoist adjacent to the present one will be installed in addition to a 75-ton electric driving wheel drop pit table and three electric drop tables for dropping tender and engine truck wheels. The 75-ton table will replace a 50-ton table. These improvements will total \$220,700. The company is now preparing data to request bids on the work.

WELCOME ADDITION: This new 50-ton electric furnace, said to be the largest in the west, recently began operation at the Los Angeles plant of Bethlehem Pacific Coast Steel Corp. Completion of this installation marks a step in the \$14 million expansion program designed to double the capacity of this plant.



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New **MULTIPRESS** * with Over

TWICE THE SPEED!

Downstroke Ram Speed Increased 167%



NEW 1948 models of the MULTIPRESS offer over twice the speed for approach portion of ram cycle with slower pressing speed for actual work portion of stroke. They are available in 4, 6 and 8 ton capacities, with either manual or automatic control.

An ingenious HydrOILic circuit provides two-speed cycling without increasing power unit size or cost. During the ram's downstroke, the press operates at high speed (535 ipm). After the ram contacts the work, full preset tonnage is exerted.

Actual operation time is greatly reduced by this new HydrOILic press, allowing a greater number of parts to be processed each day. This savings becomes even more apparent in operations requiring a long ram stroke.

Write today for complete information on this new production-boosting press.

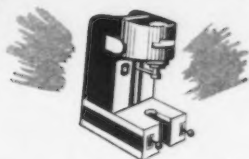
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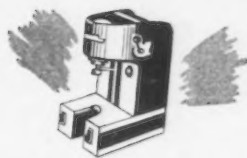
This new ram speed feature can be incorporated in your MULTIPRESSES quickly and easily. Write for details.

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THE TOOL ENGINEER'S
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MANUAL MODEL C61

Both hand levers depressed cause ram to descend at new high speed. Raising one lever slightly results in shift to normal pressing speed.



AUTOMATIC MODEL C64

Ram operates automatically, descending at new high speed, and automatically reverts to normal pressing speed upon contacting the work.

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PERSONALS

o o o

• **E. P. McElhany** has been appointed assistant to vice-president in charge of sales for Bethlehem Pacific Coast Steel Corp., San Francisco. Mr. McElhany started at Bethlehem's Seattle plant in 1939. In 1941, after 2 years in the sales department as a reinforcing steel detailer, he was transferred to the order department. In 1944 he was promoted to sales engineer, and a year later was transferred to the general offices of the company in San Francisco as chief clerk in the sales department.

• **F. J. Schaeffer** has been appointed assistant director of industrial relations of National Tube Co., Pittsburgh. He started with U. S. Steel as a helper in the sheet mills of American Sheet & Tin Plate Co., and joined National Tube in 1944 after holding supervisory positions with Jones & Laughlin Steel Corp., Republic Steel Corp., and Talon, Inc. **Robert Urquhart** has been promoted to general superintendent of the Lorain works, National Tube Co. Since 1940 he has been assistant general superintendent of the Homestead district works, Carnegie-Illinois Steel Corp. Mr. Urquhart succeeds **Bradford C. Colcord**, who has resigned.

• **M. T. Herreid**, vice-president of Koppers Co., Inc., Pittsburgh, has relinquished managership of the company's St. Paul gas and coke plant to devote the majority of his time to his duties as president of Missouri-Illinois Furnaces, Inc., Granite City, Ill. In addition to his duties as president of Missouri-Illinois, Mr. Herreid retains his vice-presidency in Koppers' Gas & Coke Div. and will continue to advise on operation of the St. Paul plant.

• **J. Frank Boxwell** has been appointed manager trade sales of the Stamford Div., Yale & Towne Mfg. Co., Stamford, Conn. **Raymond K. Watkins** has been appointed manager of builders' hardware sales; **Walter J. Cyr**, manager of door closer sales; **Edward Jones**, manager of trade relations; **John P. Dunphy**, field sales manager, and **H. Warner Hill**, assistant manager hardware sales. All are veterans of the Yale sales organization.

• **Kenneth L. Selby** has been appointed chief engineer, railway division, National Malleable & Steel Castings Co., Cleveland.

• **Robert W. Graham** has been made assistant general superintendent, Homestead district works, Carnegie - Illinois Steel Corp., Pittsburgh. Mr. Graham was first employed at Homestead in 1925. In 1943 he was transferred to Geneva Steel Co. as division superintendent in charge of rolling mills. He returned to Homestead in 1947 as assistant to the general superintendent, the position he held at the time of his present appointment.



R. J. RITCHEY, director, market development division, U. S. Steel Corp. of Delaware.

• **R. J. Ritchey**, manager of market development of Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, has been appointed director of the market development division which has been created as a new unit of the sales department of U. S. Steel Corp. of Delaware, Pittsburgh. Mr. Ritchey began his service with Carnegie-Illinois in 1937 in the sales promotion division of the sales department. He was made assistant manager of the company's market development division in 1942, and manager in 1945.

• **Carl Scheffler** has been made director of industrial relations for the Ford Motor Co.'s parts and equipment manufacturing division, Ypsilanti, Mich.

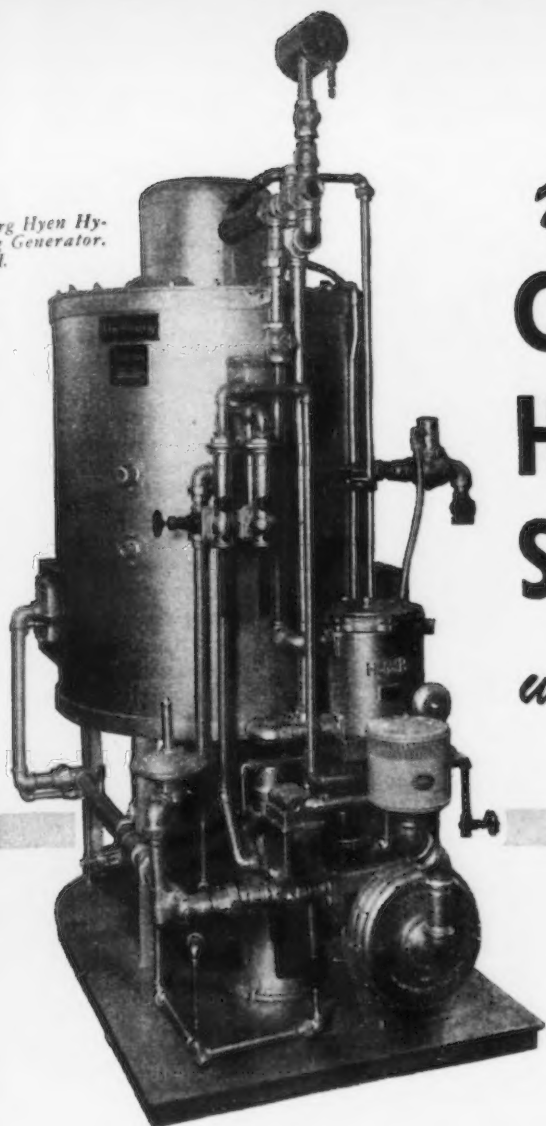
• **Neal V. Musmanno** has been named staff assistant in personnel and public relations, the Glenn L. Martin Co., Baltimore.

• **John R. Gaut** has been appointed assistant manager, Chicago district operations, American Steel & Wire Co., and **Nelson W. Dempsey** has been named general superintendent at Waukegan works, to succeed Mr. Gaut, while **Vernon L. Strohm** has been moved up to the position of division superintendent of wire mills to fill the vacancy left by Mr. Dempsey. Mr. Gaut started to work for American Steel & Wire Co. in 1919 and has been general superintendent of the Waukegan plant since 1943. Mr. Dempsey's first position with American Steel & Wire was as a laboratory technician at Worcester, where he began in 1917. In 1944 he was transferred to Waukegan as assistant superintendent of the wire division and in September was named division superintendent, which position he has held to the present time. Mr. Strohm has worked for American Steel & Wire since 1923. His entire career with the company has been in Waukegan, where he has held a number of positions, the latest being department superintendent of the dry drawing department.

• **Homer C. Lackey** has been appointed district sales manager of the Midvale Co. in Cleveland. He succeeds **Walter B. Smyth**, who has retired after 25 years in the same position. Mr. Lackey has been connected with Midvale since 1930. During this period he has held various production and sales assignments, the most recent as sales representative in Michigan.

• **L. A. Hamilton** has been appointed vice-president in charge of the Seattle district of Air Reduction Pacific Co., the new subsidiary of Air Reduction Co., Inc. He came to Air Reduction in 1930. **E. W. MacCorkle, Jr.**, has been appointed vice-president in charge of the Portland district. **H. W. Saunders**, with the company about 30 years, has been made vice-president in charge of the San Francisco district, and **H. A. Hoth** has been appointed vice-president of the Los Angeles district. Mr. Hoth has been with the company for 12 years.

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dryzing Generator.
750 CFH.

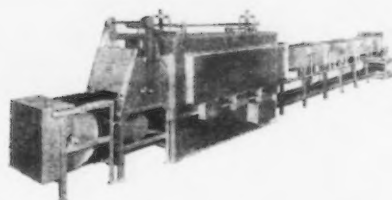


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**COPPER BRAZE
 HIGH CARBON
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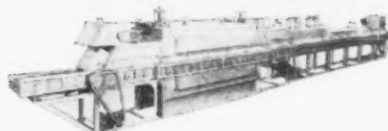
Do you have a job that calls for brazing high carbon steel parts,—without decarburization? Investigate the possibilities of Lindberg Brazing Furnaces,—with the Lindberg Hyen Hydryzing Atmosphere Generator.

LINDBERG HYEN HYDRYZING ATMOSPHERE eliminates decarburization. This is possible because the HYEN generator employs a new design principle in the endothermic cracking of city, natural, propane, or butane gases. A refractory retort is used which permits much *higher cracking temperatures* than ever before used,—thus decarburizing constituents (carbon dioxide and water vapor) are eliminated.

The Hyen is a versatile as well as a precision generator,—can be set to be in equilibrium with any carbon content steel. Once set, atmosphere analysis remains constant, and *will not drift*.



Lindberg Mesh Belt Conveyor Brazing Furnace. Work chamber 20 inches wide, 8 feet deep, 10 inches high. Cooling chamber 24 feet. Work capacity: 450 to 700 gross lbs. per hour.



Lindberg Roller Hearth Conveyor Brazing Furnace. Work chamber, 18 inches wide, 9 feet deep, and 1 foot high. Cooling chamber, 36 feet. Work capacity: 750 gross lbs. per hour.

LINDBERG BRAZING FURNACES are especially designed to prevent infiltration of air. Consequently decarburization is eliminated because furnace atmosphere is maintained with the same degree of purity at which it was generated.

Lindberg Brazing Furnaces need *never be cooled* for element maintenance. Globar elements may be replaced from *outside* the furnace.

Bulletins 190, "Lindberg Controlled Atmospheres"; 201 "Lindberg All Purpose Brazing Furnaces" and 210, "Lindberg Continuous

Production Brazing Furnaces" are available on request. Lindberg Engineering Co., 2452 W. Hubbard St., Chicago 12, Ill.

LINDBERG  **FURNACES**

• **Frank B. Stewart** has been made assistant manager of the San Francisco district of U. S. Steel Supply Co., warehouse subsidiary of U. S. Steel Corp. Mr. Stewart has been associated with U. S. Steel subsidiaries since 1936. He was first employed as an industrial engineer by Columbia Steel at its Torrance plant, Los Angeles. A year later he was transferred to the southern division sales office of the company, and in 1940 became sales service manager of the area. He held this position until receiving his appointment with U. S. Steel Supply Co.

• **Joseph P. Bauer**, former manufacturing manager of the Republic Aviation Co., has been elected president of the Metals & Alloys Specialties Co., Buffalo, and **Lester Benson**, former manager of manufacturing of the Bell Aircraft Corp., has been elected vice-president.

• **John S. Coleman**, president of the Birmingham Trust National Bank, Birmingham, has been elected a member of the board of directors, Sloss-Sheffield Steel & Iron Co., Birmingham.

• **Harry E. Outcalt** has been appointed manager, zinc oxide sales, of the St. Joseph Lead Co., New York. He has been associated with the company since 1931, served as manager of technical service and more recently as assistant sales manager.

• **Garlan Morse** and **Frederick W. Fulle** have been appointed merchandising managers of the lamp division and fixture division, respectively, of Sylvania Electric Products, Inc., New York. In his 12-year association with the company Mr. Morse has held various positions in the manufacturing, production, merchandising and sales departments of the lighting division. He will maintain his headquarters in Salem, Mass. Mr. Fulle joined Sylvania in 1943 as merchandising manager of cold cathode products. He most recently supervised production and sales of the wiring devices plant whose manufacturing facilities have now been consolidated by the company.



HOWARD F. MONCRIEFF, president, Swan-Finch Oil Corp.

• **Ernest V. Moncrieff**, formerly president of the Swan-Finch Oil Corp., New York, has been elected chairman of the board of the company. **Howard F. Moncrieff**, formerly vice-president in charge of sales, has been elected president and chief executive officer. Both have been with Swan-Finch for over 30 years.

• **R. G. Morey** has been appointed to represent Quincy Compressor Co. of Quincy, Ill., in upper New York State, Pennsylvania, Maryland, Virginia and the District of Columbia. **Roy Nesbitt** has been appointed sales representative of the company's line of air compressors in Georgia, North Carolina, South Carolina and Florida.

• **D. E. Brown** has been appointed to take charge of the Cincinnati sales office of the Barber-Colman Co. He replaces **M. N. Hough**, who has retired. Mr. Brown has been a service representative for several years, working out of the Rockford, Ill., office.

• **William J. Priestley** has been elected a director of the Union Carbide & Carbon Corp., New York. He has been with the organization since 1923, and has been a vice-president of the corporation in charge of the alloys and metals division since 1945.

• **H. A. Berg**, president of Woodward Iron Co., Woodward, Ala., since 1933, has retired from that office but will remain on the board of directors. Mr. Berg is succeeded by **Bradford C. Colcord**. Mr. Colcord served as blast furnace superintendent for Sloss-Sheffield Steel & Iron Co., Birmingham, in 1933 and 1934, and since has served as general superintendent of the McKeesport, Pa., and the Lorain, Ohio, plants of National Tube Co. **Hewitt Smith**, Woodward general superintendent of mines, has been promoted to vice-president. Mr. Berg went to Birmingham from New York in 1929 as vice-president and general manager of Sloss-Sheffield and remained there until becoming associated with Woodward, which has its operations and executive offices in the Birmingham district.

• **Sherman V. Reeves** has been appointed assistant general auditor for the Santa Fe Ry., Chicago. Mr. Reeves has been associated with the Santa Fe since 1910.

• **George H. Carden** has been named manager of the Allis-Chalmers Baltimore district office, and **T. G. Smith** has been named resident representative at Beaumont, Tex. Mr. Carden started with Allis-Chalmers in 1930 and since 1943 has been Washington district office sales representative for the organization. Mr. Smith has been with the company since 1930 and was formerly sales representative in the New Orleans office.

• **M. A. Self** has been elected vice-president in charge of sales and a director of the Bee Chemical Co., Chicago. In his new position he will direct the sales and advertising policies of the company.

• **Christian Cronin** has been appointed advertising and sales promotion manager of Olin Industries, Inc., East Alton, Ill. Mr. Cronin was formerly with McCann-Erickson, Knox-Reeves, and Sound Masters.

• **F. K. McCune** has been appointed assistant to the general manager of General Electric Co.'s apparatus department, Schenectady.

• **Pardee H. Frank**, service manager of the Timken Roller Bearing Co., Canton, Ohio, has retired after 27 years of continuous service. He is replaced by **Elmer Anderson**, who has been assistant service manager for the past year and a half.

• **L. B. McKnight** and **O. W. Carpenter** have been elected directors of Chain Belt Co., Milwaukee. Mr. McKnight was recently elected a vice-president of Chain Belt with executive responsibility for the two heavy machinery divisions of the company. Mr. Carpenter was also recently elected a vice-president of the company in charge of finance.

• **Walter D. Appel**, former chief engineer, has been appointed director of purchasing for Willys-Overland Motors, Toledo. A Willys-Overland executive since 1946, Mr. Appel was in charge of product development as assistant to the vice-president in charge of engineering until 1947 when he was appointed chief engineer for the company. **Robert E. Busey** assumes the responsibilities of acting chief engineer, reporting to **Delmar G. Roos**, vice-president in charge of engineering.

• **Burton E. Hotvedt**, sales promotion manager for Blackhawk Mfg. Co., Milwaukee, has resigned to become regional business manager, automotive division, of the Chilton publishing firm, Philadelphia.

• **Louis Kuehn**, vice-president of Metal Products Corp., Milwaukee, has been elected chairman of the board. He is succeeded as vice-president by **Edward Englehorn**, former secretary, and **Leo Kincannon** replaces Mr. Englehorn as secretary.

• **J. P. Cantor** has been appointed district manager of the new Cleveland district office of Wheelco Instruments Co., Chicago. Mr. Cantor comes to Cleveland with years of experience acquired in the New York office. **Herbert Proske**, veteran Wheelco sales representative, has been promoted to the position of assistant district manager of the New York office.



STANWOOD W. SPARROW, vice-president in charge of engineering, Studebaker Corp.

• **Stanwood W. Sparrow** has been named vice-president in charge of engineering of Studebaker Corp., South Bend, Ind. He succeeds **Roy E. Cole**, retired. Mr. Sparrow joined Studebaker's engineering staff in 1926, and was named chief of Studebaker research and development in 1937.

• **Stanley Ostrander** has been named general manager of the Highland Park plant of the Ford Motor Co. Mr. Ostrander has served successively as general plant superintendent, plant manager and general manufacturing manager of Pontiac Div. of General Motors.

• **N. Martin Steffens** has been appointed director of purchases of Geuder, Paeschke & Frey Co., Milwaukee. Mr. Steffens has been with the company for the last 30 years in the purchasing department, and for the last several years has been assistant director of purchases. **P. J. Kuipers**, who has been the director of purchases and who has been with the company 32 years, will remain in an advisory capacity.

• **Edward G. F. Arnott** has been named assistant director of research for the Westinghouse Lamp Div., Bloomfield, N. J. plant. Mr. Arnott joined the company at the Lamp Div. in 1933.

• **N. C. Freeman** has been appointed assistant advertising manager of the Pontiac Motor Div., General Motors Corp., Pontiac, Mich. Mr. Freeman has been a Pontiac employee since 1925, beginning in the payroll department. In 1928 he shifted to advertising in charge of budget control and he has since remained in that department, with additional duties in sales promotion. **Latham Clark**, Buffalo zone manager since 1944 of Pontiac, has been transferred to Boston as zone manager. **Lonnie H. Holmes**, who has been assistant zone manager at Atlanta, moves to Buffalo to take Mr. Clark's place.

• **Frederick K. Vial**, vice-president and a director of the Griffin Wheel Co., Chicago, has retired. He joined the company in 1902.

• **Frank B. Thacher** has been elected president of the Carbon Limestone Co. of Youngstown, Ohio. Mr. Thacher has been connected with the Great Lakes Carbon Corp. for 8 years, and for the past 5 years he was general manager of their electrode division at Niagara Falls, N. Y.

OBITUARY...

• **Fred W. Shaw**, 60, special sales representative of the Columbus-McKinnon Chain Co., Tonawanda, N. Y., for 26 years, died Feb. 4.

• **Dr. E. Roy Alling**, 59, president of the Rice & Adams Corp., Buffalo, died Feb. 1.

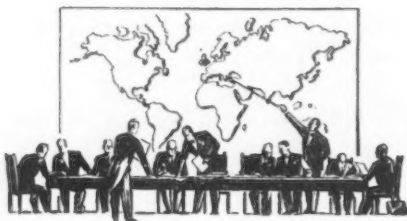
• **W. L. Thoma**, district sales manager for Republic Steel Corp. in San Francisco, died Feb. 6. He held the sales managership for more than 9 years prior to his death.

• **Richard Kast**, president of the Kast Copper & Sheet Metal Co. of Buffalo before his retirement last year, died Feb. 2.

• **Dr. August C. Klein**, vice-president and engineering manager of Stone & Webster Engineering Corp., New York, died suddenly on Feb. 3.

European Letter . . .

• Britain perilously close to inflation . . . Labor government with back to wall endeavoring to keep wages down . . . Unions will have to give government support or face the consequences.



LONDON — With a sudden decision and a show of independence which appear to have come as a shock to Transport House, the government has restated and strengthened its views on wages policy. It is little more than a month since the Trades Union Congress published its own evasive interim statement on the economic situation—a document which, after 2 months of discussion with the government, claimed that increases in wage rates had been reasonable, that collective bargaining had been conducted with restraint, and that the food subsidies had been fully justified by “price stability.”

If the government's statement, which the Prime Minister made recently, has any distinctive merit in the long sequence of appeals to its Trade Union supporters to go easy in pressing their wage claims, it is because it uses more serious language about the active danger of inflation through higher costs and higher prices than any of its predecessors, and is at last prepared to contemplate the use of sanctions.

Britain's inflationary peril, of course is no new discovery. To all who are not economically purblind, it has been as plain as a pikestaff for months past. At the very moment when the TUC was preening itself about moderation and price stability, the spiral was receiving another twist. While it talked

vaguely about methods of controlling prices and profits—delicately leaving wages unmentioned—the unions were busy putting in their claims for higher pay.

The government's “Statement on Personal Incomes, Costs and Prices” shows a refreshing realism after the TUC's interim statement. Indeed, no government which retained the will to govern could have regarded that flabby document as an acceptable contribution to the task of combating inflation. To be sure, the government's statement itself still deals largely in the kind of exhortation which has characterized, and weakened, all its utterances on wages policy ever since the White Paper of January last year. It talks about “personal incomes,” when it really means wages; and the principles which it seeks to lay down are in some respects negative and inferential when they might be plain and direct.

BUT, when that is said, it is a statement which shows some courage, and it may well invite trouble from its own trade union supporters. It will have no appeal to Left Wing publicists who have lately been indulging in every variant of economic escapism and advocating every fancy nostrum, from a capital levy to a state-organized lottery, to fight inflation. The government's statement has none of this nonsense. Costs and prices are rising dangerously fast, and it is the inflationary pressure of higher wages which is mainly, though not entirely, responsible.

Hitherto, the Trade Unions have been able to ignore, and on occasion to procure the withdrawal, of official statements on the need to stabilize wages. Indeed, only a few

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weeks after the Prime Minister had urged, at the height of the economic crisis last August, that demands for increased wages should not be pressed, a reminder of his words sent out by Mr. Isaacs, as Minister of Labor, was repudiated by the government on the intervention of the TUC.

For any sign that the government is developing an economic will

of its own, there must be genuine relief. But lest anyone should rush to the conclusion that the government has, at long last, stumbled on a wages policy which will be economically effective and politically acceptable, it is well to examine what the statement says with some care.

The emphasis is properly placed: Personal incomes must be kept down because any general increase in incomes unaccompanied by increased output will raise the level of costs, and thus imperil the export drive and lead to a further inflation of prices at home. The analysis is simple—indeed self-evident. The remedies proposed are much less clear-cut.

First, the government declines to interfere with free contracts of service between individuals and organizations. Secondly, it insists on the strict observance of collective agreements—there must in particular be no poaching of labor by paying more than agreed rates. Next, until more goods are available in the home market, there is no justification for a general increase in individual money incomes. The exception, fourthly, arises where an increase in money wages alone will attract labor to undermanned industries.

UNLIKE so many earlier statements on wages policy, this gets near to saying something. It urges those who are concerned with negotiations for increased wages not to depart from the four principles. But there are several important wage claims which are pending. The miners and railwaymen are asking for a revision of the wage structure, which is clearly a euphemism for increased pay for certain grades of labor. The engineers are about to launch a campaign for a general increase in pay for all grades in the industry. Negotiations in the clothing and furniture industries are still unsettled, and road passenger transport workers and lower grade civil servants have recently put in their claims. In all, several million employees are involved. Will they not try to set up the claim that they got their foot in the door before the government closed it?

But this time the government is

not content with mere exhortation. It has found sanctions which will go some way to secure the observance of its firmer policy. First, the government itself can observe its own principles in any wages negotiations in which it is directly concerned — which may affect not merely the civil servants but also, at second remove, the miners and railwaymen. For other industries there is a threat which has a distinct sound of menace.

If . . . remuneration is increased in any class of employment, whether in private industry or under a public authority, there can be no presumption, whatever may have been the practice in the past, that the resulting costs will be taken into account in settling controlled prices, charges or margins or other financial matters requiring government action. Each case will have to be considered on its merits in relation to the principles enunciated above.

As a deterrent to unthinking increases in wages in industries serving a booming home market, this warning may well have some effect. It is an open invitation to every industrialist to say "No," because he fears that he may be penalized if he agrees too easily to pay more wages. But experience of price control in the past suggests that this may be a sanction with general rather than precise power behind it.

DESPITE its general title, the government's statement is concerned almost entirely with wages. But there are some further points in it which invite comment. The government infers from the four principles which it lays down that there is no justification at the present time for any rise in incomes from "profits, rent or other like sources."

The farmers, before whom the attractive bait of money incentives has been dangled in the plan for agricultural expansion, will certainly wonder what this phrase means. The ordinary shareholder, who was always taught to regard profits as a surplus—and may one day re-learn that simple truth when inflation no longer guarantees bumper profits to the least efficient—is asking himself whether the exhortation to limit dividends will not be followed by a stiffer profits tax. As for rents, which are largely controlled already, is it expected that honest landlords can indefi-

nately maintain their property in good order out of prewar rents, without allowing for higher prices?

But these are points on the margin. So, at the moment, is the government's very necessary reservation that if the cost of living rises markedly in future, those incomes which fall below an adequate level would have to be increased. The government has issued a warning more serious, more forthright, and more determined than any of its earlier statements. It has, indeed, gone to the practical limit of what could be expected of a popular democratic government.

Their task in wages negotiations will now bear a special weight of public duty and responsibility. They will have much educational work to do, both on themselves and their followers. They will have to show what the alternatives are: A mere increase in money incomes which secures only a passing improvement in real wages at the expense of other members of the community, or a further impetus to rising costs, stagnation in exports, threatened unemployment and a thriving black market.

FOR a movement which has always judged its prosperity by the Friday pay packet, these are hard lessons. But they are an essen-

tial part of the process of re-education which has been going on in the Labor movement during the past 12 months. A year ago, views on the perils of inflation and demand that the government should adopt a disinflationary policy were widely denounced. Howls went up against "banker's remedies" and the "sanction of starvation." Let the record speak for itself, for it represents the changing convictions of a government pledged to full employment, economic equality, and expanding prosperity.

Cuts have been made in the capital investment program. The painful necessity of paying for imports has been realized. Cheap money has been thrown overboard, and the foolhardy creation of bank credit arrested. Prices are now allowed to rise and the self-imposed limit on the food subsidies is being observed.

Now, belatedly and with a rather nervous conviction, comes a policy for arresting the wages spiral. This begins to make a pattern of economic policy, and the *oikos*, be it noted, is not a capitalists' paradise, but an aspiring Socialist democracy. But of all these changes of front, the wages policy is the most critical. It will succeed only if the unions give loyal support to the government's conclusions, and accept them, if not with sympathy, at least with understanding.

POWER STATION: This new power station, being built at Croydon, Surrey, England, is expected to be completed in 1949. On the right can be seen the electrostatic grit precipitator casings, and on the left, part of the substructure, 60 ft high, which will be for a 20 ton travelling derrick. Completed station will include rail siding, coal storage, switch houses, pump rooms and cooling towers.



Industrial News Summary...

- **Additional Steel Prices Raised**
- **Union to Ask Substantial Hike**
- **Heavy Melting Prices Weaken**

FOR the second week in a row the steel market and steel prices have been totally unaffected by commodity and stock market action. This week steel prices are stronger, demand is heavier, supplies are lighter and gray market activity is unchanged.

Steelmakers in the past week have shown their faith in the solidness of steel demand by raising prices on all types of pipes and tubes, certain semifinished material and have sharply boosted extra charges on structural steel shapes.

Pipe price changes will average around \$7 a ton. The total increase cost to pipe consumers will be about \$43 million on an annual basis. The bulk of these higher prices will be borne by the oil, gas and water industries. The construction group will also find their costs increased by higher prices on merchant pipe used in basic construction work.

Some steel firms have advanced oil tubing to a higher level than the \$9 a ton increase posted by the U. S. Steel Corp. Two major producers have marked up the price of this item anywhere from \$10 to \$20 a ton. Line pipe urgently needed for oil and gas lines was advanced \$9 a ton in the small sizes and \$6 a ton in the large sizes.

The structural fabricating industry this week began to pay higher size extras on structural shapes. It is estimated that on a yearly basis this change in extras will cost structural fabricators approximately \$15 million.

Major steel firms which sell forging and rerolling billets, blooms and slabs have changed their pricing system to a net ton price basis instead of gross tons. This has meant an increase of \$4.89 a ton on forging semifinished steel and \$4.82 a ton on the rerolling grades. Nonintegrated makers who make finished steel products from these items will find their cost increased on an annual basis approximately \$10 million.

TALK by steel officials advocating lower steel prices has not been supported by these price increases and by others which have been made since the first of the year and which included tin mill products, alloy bar extras, nails and fencing and certain railroad specialties. It could possibly be that some of these increases are anticipating the wage demand to be made this week by Philip Murray, steel union head.

Philip Murray's oft repeated statement, made again early this week, that the union would live up to its contract which calls for no strike or work stoppage, cannot be taken as an indication that the union will not obtain a wage increase this year. Mr. Murray will indicate this week that his union's economic foundation for a wage increase stems from steel company profits, tax rebates and the failure of the commodity market break to affect the cost of living for steel workers.

It is definite that Mr. Murray will not, as far as the steelworkers are concerned, name a cents per hour wage demand. The union will ask for a substantial increase. In addition to this, heavy pressure will be placed on a demand for health and security concessions.

A special check by THE IRON AGE editors this week failed to disclose any crack in the steel demand wall. The recent decline in the steel ingot rate and the loss of output due to cold weather has met head on with increased consumer requirements. Gray market steel prices which would be the first to be affected by adverse market conditions have reached a new high in the past week.

Some light gage cold-rolled sheets were selling between \$315 and \$333 a ton compared with a mill price of \$85 to \$90 a ton. Ordinary hot-rolled sheets were selling in the gray market at prices ranging from \$200 to \$260 a ton.

CONVERSION deals on the fire have been shaken somewhat by pressure from rolling mills against accepting ingots made from high-priced scrap. Spot prices on ingots, which have run as high as \$113 a ton, may be dropping. But prices on slabs and sheet bars are stronger than ever because of heavy demands.

Scrap consumers this week were gleefully sticking the harpoon into any and all scrap dealers who had their confidence shaken by the commodity price drop. This was reflected in the Chicago market where the price of No. 1 heavy melting declined an average of 75¢ a ton and in Philadelphia an average of 50¢ a ton. THE IRON AGE scrap composite this week is down 42¢ a gross ton to \$40.08 a gross ton. Whether there will be a sharp break in the market remains to be seen.

New mill relationships are being developed by some lucky steel consumers in New England. In Worcester, companies which lost out on mill allocations for one reason or another, are having some success in selling steel companies on their prospects as long-term customers.

There is some strong feeling that steel salesmen are the key to good or poor feeling between the steel companies and their eager customers. There are salesmen who know their field well enough so that they can offer a little material on the side when a customer does not need his quota for a month or two.

The ingot operating rate this week remains unchanged at 93 pct of rated capacity. THE IRON AGE finished steel composite this week, after revisions because of the pipe price increase and latest steel shipment figures, is 3.23940¢ per lb. This is up 0.04529¢ per lb from last week or approximately 91¢ a ton.

• **PIPE PRICES**—Counting the advances made last week, pipe prices have been boosted four times since early February 1946. The total price advance in common sizes of merchant black pipe since early February 1946 has amounted to \$30 a ton. The price of black merchant pipe this week is about 47.6 pct over the 1939 base price. Last week's advance was \$7 a ton on black pipe and \$10 to \$12 a ton on the galvanized product. Oil well casing under 8½ in. diam was boosted \$9 a ton; 8½ to 13¾ was up \$6 a ton and no increase was made in 14 in. and larger. Oil well tubing was marked up \$9 a ton, drill pipe \$6 and boiler tube 7 pct. Line pipe under 8½ in. was boosted \$9 a ton, 8½ in. and over was upped \$6 a ton. Nothing was said about plate prices which leaves some speculation over the difference between large diameter line pipe made from plates and that made from seamless.

• **STEEL PAYROLL**—Companies in the steel industry paid out to their employees in 1947 the record total of \$1,986,661,000 in wages and salaries, an increase of 28 pct over the 1946 payroll, according to American Iron and Steel Institute. Record hourly rates of pay prevailing during the last 9 months of the year and sustained high levels of employment accounted for the huge total. It was 14 pct larger than the wartime peak year of 1944 when payrolls totaled \$1,745,019,700, and more than doubled the pre-war peak of \$976,083,169.

• **JANUARY RECORD**—Steel production in January set a new peacetime record for that month, according to figures released by the American Iron and Steel Institute. The month's output of 7,463,112 tons of ingots and steel for castings was a quarter million tons over the output of the same month in 1947. The only higher January production was the wartime output of January 1944, at 7,592,603 tons.

• **EXPORTS**—December commercial exports amounted to \$1069 million, slightly under the November figure, and brought the 1947 total to \$13.8 billion exclusive of foreign aid and similar shipments. These approximated: initial shipments under the Interim Aid Program (all destined for France), \$18.7 million; other relief shipments, \$33.9 million; commitments to Greece, \$6.9 million; \$1.1 million for UNRRA; and, \$900,000 under Lend-Lease.

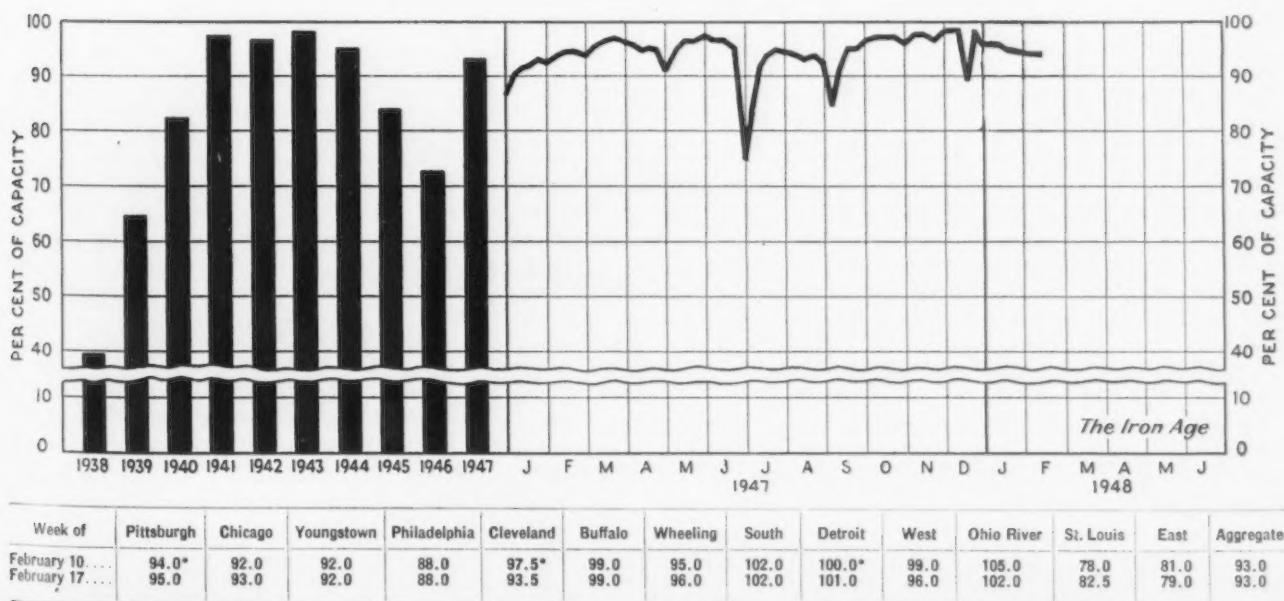
• **SEMIFINISHED CHANGED**—Carnegie-Illinois Steel Corp. has put the price of rerolling and forging billets, blooms and slabs on a net ton price basis. Forging grades are now \$54 a net ton, reflecting an increase of \$4.89 a ton. Rerolling items are \$45 a net ton, reflecting a price increase of \$4.82. Extras have also been placed on a net ton basis. On the forging grades this is an increase of 11¢ a ton per dollar of extra. But on the rerolling billets, blooms and slabs on sizes 1¼ to 4 in. there has been a net increase of \$2.22 a ton in the size extras. On sizes 4 x 4 in. and 6 x 6 in. there has been a net increase in size extras of \$2.11 per net ton. Forging ingots have also been put on a net ton basis, the price being \$46 per net ton.

• **BRITISH PRODUCTION**—A new monthly steel production record was established in Britain in January, when output was at an annual rate of 14,589,000 long tons, compared with 12,646,000 tons a year in December and 12,470,000 tons in January, 1947. The previous high was in October of last year, when an annual rate of 14,316,000 long tons was reached. The best previous January figure was a rate of 12,927,000 tons in 1943. Pig-iron output showed an increase last month to an annual rate of 8,726,000 tons, compared with 8,561,000 tons in December.

• **PIPE POOL**—The Appalachian area is daily getting 100 million cu ft more gas this year than last from the Tennessee Gas Transmission Co. line. For this the consumer can thank U. S. Steel, Jones & Laughlin, Sharon, Crucible, Wheeling and Armco. Though only U. S. Steel and J. & L. are pipe producers, the other companies pitched in to supply semifinished steel to a pool to make it possible for the pipe producers to increase shipments for this line. It has also meant less of a cut in steel production for the cooperating companies.

• **ATOM PLANT MOTORS**—The Atomic Energy Commission has placed an order with Westinghouse Electric Corp. for \$467,000 worth of electric motors to be used at the Hanford, Wash. plant where atomic energy studies are under way. Ranging in size from 60 to 1000 hp, some of the motors will be built at the new Westinghouse plant in Sunnyvale, Calif., and the rest will come from the company's motor division plant at Buffalo. Deliveries are expected to begin in July.

Steel Ingot Production by Districts and Per Cent of Capacity



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Spectre of Iron Ore Shortage Dims Dreams of More Pig Iron

Scramble for Spring Tonnage By Producers Hoping To Expand Blast Output

By BILL LLOYD
Cleveland Regional Editor

ORE: These ore cars are being loaded at Hull-Rust mine, largest open pit iron ore mine in the world. Located at Hibbing, Minn., it is operated by U. S. Steel's Oliver Iron Mining Co.

Cleveland

••• First sample of the impending shortage of iron ore, a spectre of growing stature in the steel industry, has been putting the double whammy on the fondest plans of blast furnace operators to increase production of pig iron this spring.

Fantastic as this may seem to those perpetual optimists who consider the Mesabi Range the source eternal of the most strategic mineral of them all, the scramble for spring tonnage is on, particularly among those iron ore consumers contemplating additional blast furnace capacity.

As usual, the iron ore industry is not surprised. On the other hand, consumers readily concur that the problem this year is serious, both as to ore volume and carrier capacity. Ore, it may be recalled, was short at the close of navigation last season. That is, consumers who jumped their winter requirements at the last minute were unable to buy the additional tonnages.

It is understood that owners of the major reserves on the ranges

are willing to sell their less fortunate colleagues, which are numerous, all the ore they want providing the purchasers can carry it down the lakes or to the consuming point, wherever it may be.

By April 1, theoretical date for the opening of Great Lakes navigation, iron ore stocks on hand will be down to an estimated 15 million gross tons, which will probably not be in consumers' yards in proportion to their needs. Some shifting of stocks is a possibility, but, with most consumers setting up their requirements higher than 1947, and in the event lakes shipping gets a late start, most consumers will have to do the best they can with what they have on hand.

Pittsburgh Steel Co., which hopes to blow in a new stack bought from War Assets Administration, applied for and got an all-rail freight rate from Duluth to Monessen, Pa., something which has never been done before in the history of the steel industry.

Pittsburgh Steel Co. wants to blow in the furnace before the

opening of navigation some 60 days hence. Application was made by the P.&L.E. Railroad for a \$4.90 rate, from Duluth to Monessen, and was given a \$5.10 rate, after the recent freight rate increase, it is understood.

Ford Motor Co. has been readying a new blast furnace and enlarging ore storage facilities at the Rouge in anticipation of increased iron ore requirements. Ford owns ore properties which supply a large part of its requirements, and purchases additional tonnage from another supplier. It is understood, however, that no commitments have yet been made for the balance of Ford's 1948 needs.

The two 700-ton Ford furnaces now operating may require relining soon, possibly by fall. At the moment, the new 1400-ton furnace is up to its October schedule and the company's ore requirements (about 1920 tons per day) will be doubled when it starts operating, according to reports.

Portsmouth Steel Corp., according to reports, is negotiating for

an operating agreement for "X" furnace of Wickwire Spencer-Colorado Fuel & Iron Corp., at Buffalo. Republic Steel Corp. is presently operating "Y" furnace under an agreement.

Wickwire Spencer, it is understood, is rebuilding "X" furnace at the present time, and is planning to put the furnace in blast about May 1.

Portsmouth Steel Corp. is going out of the foundry coke business, and will have a surplus for operation of "X" furnace.

While Portsmouth's negotiations for the furnace have not passed the talk stage, it is understood that the possibility of Portsmouth operating both "X" and "Y" furnaces is under discussion.

Portsmouth officials declined to comment.

At least a part of the iron ore requirements for the operation of "X" furnace, it is understood, will be met by an exchange of iron ore. Colorado Fuel & Iron Corp. will supply ore to a producer with western facilities and receive ore at Buffalo in return. Feelers are out in the trade for the balance of the Buffalo requirement. "X" furnace would be about 350,000 tons a year.

However, reliable sources believe Republic Steel Corp. is interested in operating both "X" and "Y" furnaces under an agreement with Wickwire-C.F.I.

Republic officials refused to comment.

Primarily, the present shortage of iron ore stems from the great increase in coal tonnage on the lakes during the last few weeks of the 1947 season, because coal operators were in grave doubt as to what John L. Lewis, boss of the coal miners, might do next, rather than any lack of iron ore at the mines or the size of the Great Lakes fleet.

None the less, ore consumers, large and small, will be scraping the bottom of the barrel for iron ore this spring. And present indications are that the lakes shippers will not be able to move down as much ore in April as the industry will consume.

Given a decent break on the weather for an opening, most consumers will have no serious trouble on regular requirements, but if the lakes do not open up, railroad hauling will be required to maintain present operating rate.

U. S. Steel Corp. is adding two blast furnaces at Chicago, but these will not increase the Corporation's

Buys Foreign Ore

Birmingham

• • • The Tennessee Coal, Iron & Railroad Co. here is purchasing iron ore from Brazil and Sweden to augment local ore during the remainder of 1948 to increase output of steel.

Robert Gregg, president of the U. S. Steel subsidiary, said the purchases of foreign ore do "not mean our local iron ore resources are insufficient. On the contrary, our geologists are firm in their convictions that Birmingham's iron ore reserves are sufficient to last for many, many years."

The extent to which the foreign ores can be used will depend upon the cost of those ores in comparison with local ores in the finished products.

The program now under way is the first extensive use of foreign iron ore by the Tennessee company since the late 1920's. Then considerable African ore was used.

overall consumption of iron ore very much. As soon as the new furnaces go on, two others will be pulled off.

The two coming off are smaller tonnage furnaces than the new units, but due to other limitations besides iron ore, the Corporation will not be able to run the two at their full rated capacity, and the additional ore requirements this summer will hardly be more than a boatload more than the amount they have been consuming.

Eventually, when the two furnaces are able to run at full blast,

they will need more ore.

Other mills in the Chicago area are also on thin ice. Inland Steel Co. is worried about iron ore and is wondering what will happen when they finish repairs on the No. 6 furnace, sometime in April. It is possible that Inland may not be able to blow it in immediately because of the ore shortage.

Inland is operating the big DPC furnace, bought last year from WAA, and will continue to use that in preference to the repaired No. 6 until the ore supply gets built up during the early summer months.

Conversion Deals Face Rolling Difficulties

New York

• • • Steel consumers who buy ingots and make their own arrangements to have them rolled have been going through a period of uncertainty within the past 2 weeks. Steel mills with available mill time have become much more selective recently on the source of the material that they will roll, and some wholesale cancellations have taken place.

Conversion deals already arranged have been jeopardized in some cases, and one ingot producer in particular has been having great difficulty in making new contracts. Large integrated producers have taken the viewpoint that the independent ingot makers were running up scrap prices to the detriment of the larger mills. As a result, they are reported to have become very fussy about where any semifinished steel originates.

There is some difficulty, too, about quality of steel and size of

ingots. Rollers complain that the quality of some ingots they receive has slowed down their operations considerably and contributed to excessive scrapping. One large producer is known to keep a file of currently acceptable ingot makers to filter out undesirables. The exact complaint against some of the names on the list is not known.

There is no indication that this flurry of recrimination is a sign of weakness in the conversion field. Inquiries continue to come in as frequently as ever, although it does appear that ingots are becoming relatively easy to get at spot market prices. A charming voice is trying urgently to dispose of a steady allotment of 4000 tons per month at \$75 per ton—f.o.b. a mill said to be at about a \$15 freight radius from Chicago. Ingot offers are said to be now at ranges below those of a few weeks ago. This may, however, be a reflection of rejection of low quality ingots recently.

Commodity Slump is Ace-in-the-Hole for Steel in Wage Parley

Pittsburgh

••• Steel leaders are no longer over the high-cost-of-living barrel in their coming wage negotiations. The commodity price break came to their aid. Before that time the union's argument on high food prices was unassailable. Now the argument is still valid, but with reservations.

Prices of food, clothing, rent and other essentials are still too high say union leaders. Any management official who believes that the commodity price bust has won the wage battle for him is off the beam. The cards are now well shuffled for both sides. The poker game is on. Both sides are respectful of each other's ability—to play poker that is.

Steel will not raise wages without in some way stepping up revenues at least enough to take the curse off the increased costs. But the end of steel price increases is in sight. It has to be. The action of grain and stock markets is too potent a medicine to allow any steel company to trifle with overpricing.

Since steelworkers can't eat steel they are unperturbed with pricing policies of steel firms. All the best arguments in the world leave them unmoved. Most steel leaders have been privately aware for months that a third round of wage increases was in the cards. Some now doubt it. But that does not change the pack.

Both Ben Fairless and Phil Murray knew what they were doing when they signed a 2-year contract last year. It was an out for both of them and it was based on mutual respect and understanding. The contract says if no agreement is reached the old wage rate holds for another year. That point will be pushed harder than it would have been if the trade markets had not broken.

But to believe that the union has lost its smoke and punch because wheat prices are closer to what they ought to be is nonsense. The bargaining will be rough and long. The longer it takes to reach an agreement the better bargain EACH side will get.

There won't be any labor trouble in the steel industry this year unless it comes from a mine closing.

But Union Still Has Plenty Of Power Left to Push For Moderate Hike

By TOM CAMPBELL
News-Markets Editor

Phil Murray can't do anything about that but Ben Fairless can—and will, probably after everyone else gets through playing around with the alleged coal crisis.

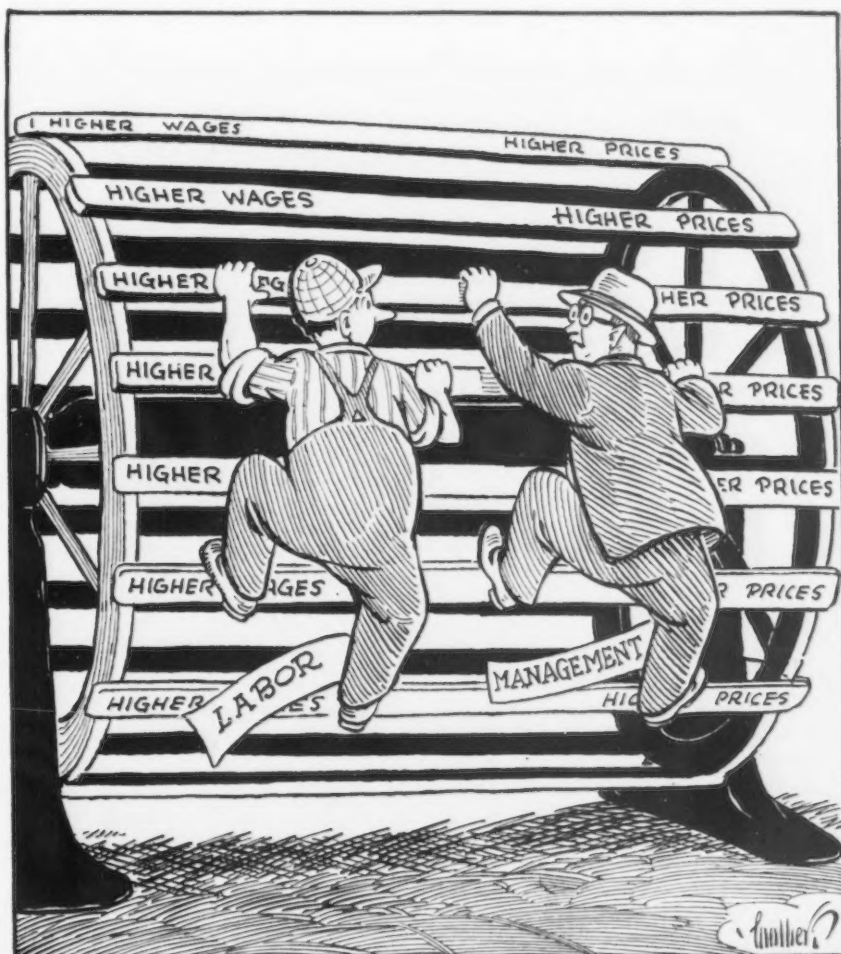
Steel leaders believe that consistent wage increases have caused the cost of living to go up. Mr. Murray thinks just as strongly that wage increases in steel did not raise the cost of living. No amount of wrangling on either side's part

will change the respective positions on that question. Nor will it have anything to do with the amount of the wage increase to be wrung from steel by the union.

Unless there is a shocking drop in the price of goods other than grains and other food items, unless the stock market violently reacts and unless all the heavy demand for steel for building purposes, expansion, repair and maintenance, export and a hundred and one other things dries up, it looks like steel labor will get some kind of a wage increase. It will be moderate and steel firms will probably find some way to painlessly get enough of a boost on some steel items to pay the freight on the increase.

Steel leaders can't divorce the steel wage question from coal. They

Had Enuff?



The IRON AGE

would like to, but no dice. No one will really argue long about the \$100 a month pension for coal miners who have been on the job for 20 years. They will argue though about reaching out over the world and giving that amount to all those who mined for 20 years then went somewhere else to make hay.

Steel firms have for years been the fall guy for John L. Lewis's crises because of their captive mines. It used to be the captive mines serving the steel industry ran during any crisis and finally paid the scale ultimately agreed to by the UMW and the commercial mines. All that changed when John L. realized that if he shut down the steel industry he could get more attention on his demands. There is

nothing steel can do about this—except see that the squabble is ended as soon as possible, and at as good terms as is possible.

Those in coal know that what counts is what Mr. Lewis will ask for besides the pension agreement. That is old business. He never

shows up with anything less than a full bag of shocks and surprises. This year will be no exception. But even the great John L. has to recognize what Phil Murray has—conditions this year are not the same as last year. But maybe John doesn't give a damn.

Offers Three Fellowships

Pittsburgh

••• Three Latin American students will be awarded \$1000 fellowships for graduate study in engineering and science at the Carnegie Institute of Technology for the academic year 1948-49.

The 1-year fellowships, which are awarded by the Matthes Foundation, New York City, are open

to any Latin American student who has completed with distinction, or will have completed by Sept. 1, 1948, the requirements for a bachelor's or higher degree in engineering or physical science. Examinations are to be held in the candidates' respective communities under the auspices of the Graduate Record Office of the Carnegie Foundation.

AMERICAN IRON AND STEEL INSTITUTE									
SHIPMENTS OF STEEL PRODUCTS									
ALL GRADES INCLUDING ALLOY AND STAINLESS									
(Net Tons)									
DECEMBER - 1947									
Steel Products	Number of companies	Items	Current Month		To Date This Year		Whole Year 1946		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)	Per cent of Total Shipments	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)	Per cent of Total Shipments	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)	Per cent of Total Shipments	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)
			(Net Tons)		(Net Tons)		(Net Tons)		(Net Tons)
Ingot, blooms, billets, tube rounds, sheet and tin bars, etc.	43	1	322,147	5.7	237,137	4.9	2,257,445	4.0	1,645,740
Structural shapes (heavy)	13	2	379,614	6.8	41	7.0	2,640	7.1	5,399
Steel piling	4	3	28,711	0.5	-	0.5	23	0.4	141
Plates (sheared and universal)	29	4	590,777	10.5	17,832	10.0	219,227	8.5	250,708
Skelp	7	5	8,775	0.2	17,389	0.3	384,004	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	190,245	3.4	-	3.5	991	3.7	4,890
—All other	5	7	20,980	0.4	-	0.3	329	0.3	428
Joint bars	7	8	15,249	0.2	527	0.3	15,198	0.4	5,327
Tie plates	9	9	44,334	0.8	337	0.8	4,437	0.9	18,701
Track spikes	8	10	11,852	0.2	13	0.3	146	0.3	632
Hot Rolled Bars—Carbon	34	11	520,892	9.3	73,647	9.9	745,770	10.3	707,994
—Reinforcing—New billet	15	12	111,876	2.0	987	2.0	9,775	2.1	7,381
—Rerolled	12	13	15,763	0.3	-	0.3	141,346	0.3	1,267
—Alloy	27	14	142,625	2.5	19,068	2.8	212,382	2.8	138,359
—TOTAL	45	15	791,156	14.1	93,702	15.0	967,927	15.5	855,034
Cold Finished Bars—Carbon	29	16	101,689	1.8	637	2.3	9,249	2.7	2,428
—Alloy	26	17	15,129	0.3	344	0.3	2,601	0.4	1,729
—TOTAL	35	18	116,818	2.1	981	2.6	11,850	3.1	4,157
Tool steel bars	19	19	6,724	0.1	88	0.1	1,670	0.2	374
Pipe & Tubes—Butt weld	15	20	1,040,000	2.7	5,048	2.7	68,321	2.6	4,232
—Lap weld	8	21	32,681	0.6	54	0.6	875	0.6	236
—Electric weld	11	22	106,624	1.9	367	1.8	2,380	1.4	594
—Seamless	10	23	192,772	3.4	11,912	3.3	139,926	3.8	83,441
—Conduit	7	24	15,158	0.3	648	0.2	8,497	0.2	2,448
—Mechanical and pressure tubing	13	25	56,760	1.0	1,640	1.0	20,438	0.9	3,478
Wire rods	22	26	50,358	0.9	26,568	1.1	331,192	1.4	346,506
Wire—Drawn	39	27	230,639	4.1	15,436	4.1	181,783	4.0	135,592
—Nails and staples	18	28	60,329	1.1	613	1.3	8,481	1.5	797
—Barbed and twisted	15	29	23,526	0.4	60	0.4	128	0.4	-
—Woven wire fence	13	30	30,177	0.5	202	0.6	3,616	0.8	-
—Bale ties	12	31	9,904	0.2	-	0.2	-	0.2	-
Black Plate—Ordinary	9	32	72,689	1.3	145	1.3	2,033	1.6	3,179
—Chemically treated	8	33	988	-	-	-	-	0.5	-
Tin and Terne Plate—Hot dipped	9	34	199,151	3.6	-	3.3	228	3.9	-
—Electrolytic	9	35	170,596	3.0	-	2.6	529	1.9	-
Sheets—Hot rolled	31	36	666,730	11.9	53,035	11.6	778,041	11.3	421,196
—Cold rolled	17	37	489,342	8.7	3,878	8.6	28,498	8.4	3,397
—Galvanized	16	38	138,676	2.5	169	2.5	1,462,053	3.0	1,725
—Electrical and enameling	10	39	57,362	1.0	-	0.9	385	0.9	-
Strip—Hot rolled	23	40	148,992	2.7	31,730	2.8	308,655	2.8	237,176
—Cold rolled	35	41	134,438	2.4	2,676	2.6	28,030	2.6	25,904
Wheels (car, rolled steel)	5	42	28,219	0.5	-	0.6	2	0.5	348
Axles	5	43	17,455	0.3	-	0.3	53	0.3	221
All other	-	44	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	142	45	5,613,036	100.0	522,228	9.3	5,578,367	100.0	4,297,889

During 1946 the companies included above represented 99.5% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

Steel Problems Plague New England Firms Despite Historic Quotas

Worcester

... The diversification of industry here means that the steel buying problem, so acute in big flat-rolled consuming centers, is not quite so terrifying here. Among stampers, the problem is tough. But among the many venerable companies using heavier steel products, historic customer relationships are serving well.

Many of the companies here use steel in warehouse quantities, for the making of complicated machinery for textile mills, paper mills and machine tools. The warehouses locally have made themselves many friends, have done an aggressive job of getting steel, and are doling it out to as many people as possible.

Warehouse business is picking up. Many companies that were permitted to buy from mills before the war are now relegated to warehouse sources. This shift is jacking up the total steel bill for many companies by 20 to 30 pct. The opinion is unanimous that there has been no outrageous warehouse price gouging in the district.

On the other hand, purchasing executives are getting bored with the petty angles practiced by both steel companies and warehouses to get more money for their product than published prices would indicate. The slapping on of all possible extras, the unavailability of tank grade steel, pushing of high tensile and alloys, billings of lower grade stuff as welding quality or electric furnace steel to grab some extra gravy—the purchasing men have seen them all.

Of course, what purchasing men are really waiting for is the day when steel salesmen are again as thick as flies, ready to ship anything in here, and no worry about the Worcester basing point. There is a trace of a smile on the face of buyers when the action of the brass market in the past year is recalled. Purchasing agents know that the time will come when steel salesmen are camped on the doorstep.

"We have long bitter winters here in Worcester. I've got two

Purchasing Men Are Waiting For Day When Salesmen Look for Business

By JACK R. HIGHT
Asst. News-Markets Editor

or three steel peddlers in mind right now that I'm going to leave wading in the snowdrifts when the day comes," is the way one buyer puts it. "I'm tired of being treated like a poor relation by steel men and like a moron by my boss just because of the basing point system."

Where fabricators in other parts of the country are turning strongly to conversion deals and the gray market, steel consumers in the Worcester area are confining their contact with steel brokers to casual telephone conversations that usually get about as far as the price quotation. Once in a while the would-be steel broker gets as far as saying that a certified check should accompany the order, and gets chopped down at that point. Proud New England companies bristle at the thought that anyone—let alone a shady operator in steel—should question their credit standing.

... This is the second in a series of articles on steel buying problems from the standpoint of the men who must do the buying. The first in the series, written from St. Louis, indicated that many consumers there had turned to the gray market and conversion deals for their steel in the absence of adequate mill quotas.

The great disparity between St. Louis and Worcester, as indicated herein, is partially due to the difference in character of industry in the two places. Companies in the St. Louis area are straining to carve out their competitive positions in the new expanding markets of the southwest and far west. Markets served by New England industries are of a more static character by comparison.—Editor.

There are companies here who have gone into other districts, such as Detroit, and, in some cases, the West Coast, to buy steel from warehouses. None is willing to admit that he has paid over a legitimate warehouse markup for steel. And no company is willing to admit that it has entered into any kind of deal to buy its own ingots for rolling.

There are companies, however, that are in desperate straights for steel. The stampers in this district could use a lot more steel. Those dependent solely on hot-rolled steel for their output are operating at lower levels than they would like. Some other stampers that can work nonferrous materials into their production program are in somewhat less desperate condition.

Outside the field of stampers, however, this writer found the general situation here somewhat less acute than in St. Louis 2 weeks ago. In other than sheet and strip consuming plants, industry here is based on old line companies, with long established market positions in their respective fields. Their steel needs roughly approximate their prewar requirements. In many cases, then, the steel mills' historical allocation system of distribution is functioning rather well.

Fewer of these companies are trying to corner new expanding markets. Where steel companies are shipping into this market on the basis of prewar movements, users of plate, structurals, bars, and other heavy steel items are relatively content. The word relatively is important there. Almost everybody would like to be in a somewhat more comfortable position. But few of the purchasing men interviewed for this study were willing to admit that steel availability is controlling their factory schedules.

On the other hand, the long hauls involved for many steel products into New England have moved a number of steel mills to halt shipments of particular products into this district. As freight rate increases have been approved,

this program of inadvertent attrition has expanded. It is leaving in its wake a trail of bitter, frustrated ex-consumers of steel who feast on all the ugly stories dug up by Washington committees.

The purchasing agent of a company whose whole method of operation has been disrupted because mills have stopped shipping into this district is no man to toy with. He has fixed ideas on the steel business, and what is wrong with it. It will take a lot of talking to reconvince him.

The man who uses some stainless or other alloy steel in their regular production is getting some help on his carbon steel needs. The anxiety of a number of steel producers to sell these higher-

priced items makes it possible to develop some package sales with carbon steel products.

The delay in delivery of fourth quarter quotas of steel products, and warnings that second quarter quotas are about to be cut, have many consumers worried. They fear that shipments now coming in against fourth quarter promises will actually be considered as on the current period. Some consumers see a bleak future for supplies of plates, pipe, and light structurals. They fear that the operation of many new hot and cold sheet and strip mills that is scheduled for the latter half of this year will reduce supplies of heavier items. To the stampers, on the other hand, the possibility of such an occurrence is welcome.

OIT Suspends Export License Privileges Of Three New York Firms

Washington

• • • Office of International Trade this week suspended export license privileges of three trading firms, thus making good its threats to clamp down on violators of foreign trade restrictions.

OIT named the three firms as Transcontinental Products Co., Desco Import and Export Corp.,

and Delta Mercantile Co., Inc., all of New York City.

Transcontinental, OIT said, solicited false information from exporters in foreign countries for use in applying for licenses for the export of steel. OIT regulations specify that exports of steel may be made only when the exporter can show that the commodity will be put to use by the importing country so as to contribute to economic recovery or to meet other essential needs.

Desco and Delta, which OIT

said "are largely under common ownership and control," were charged with exporting more than 600 tons of concrete reinforcing bars against an export license issued for only 100 tons. Transfers of licenses without approval of OIT are specifically prohibited by Commerce Dept. export regulations.

Export license privileges were denied transcontinental for a period of six months and were denied the two other firms for five months.

Decertification Of USWA Being Tried Under Taft-Hartley Act

Washington

• • • Making its first ruling under the "decertification" provisions of the Taft-Hartley Act, the NLRB on February 15, ordered an election in the Harris Foundry & Machine Co. plant at Cordele, Ga., to determine whether a majority of employees still wished to be represented by the United Steelworkers of America.

Action was taken upon petition of an individual member among the 248 employees. The election was ordered to be held within 30 days.

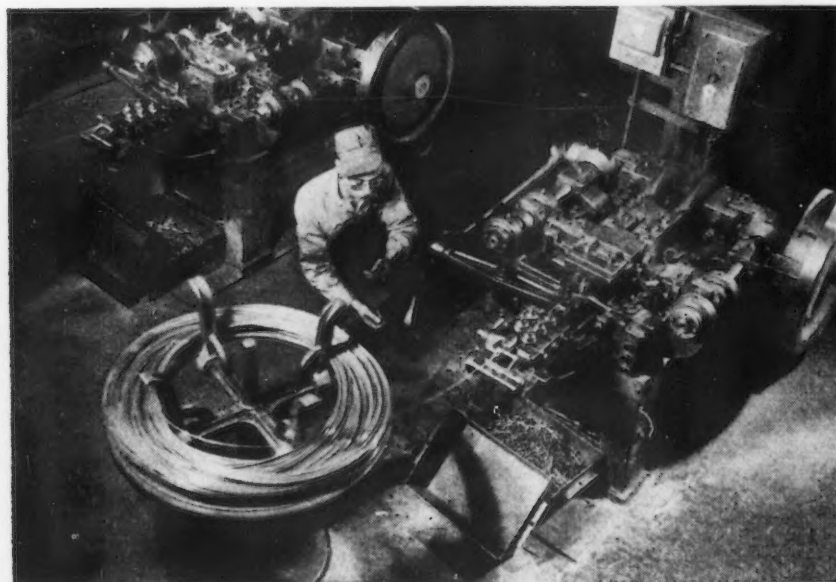
Unusual interest attends developments. The incumbent union's officers have not complied with the non-Communist affidavit requirement; therefore USWA is not eligible to have its name placed on the ballot. In any event, the board has declared that it would not certify the union as the bargaining agent unless "at that time it is in compliance with Sec. 9 (f) and (h) of the Act."

In effect, this would automatically release the company from obligation to bargain with the USWA.

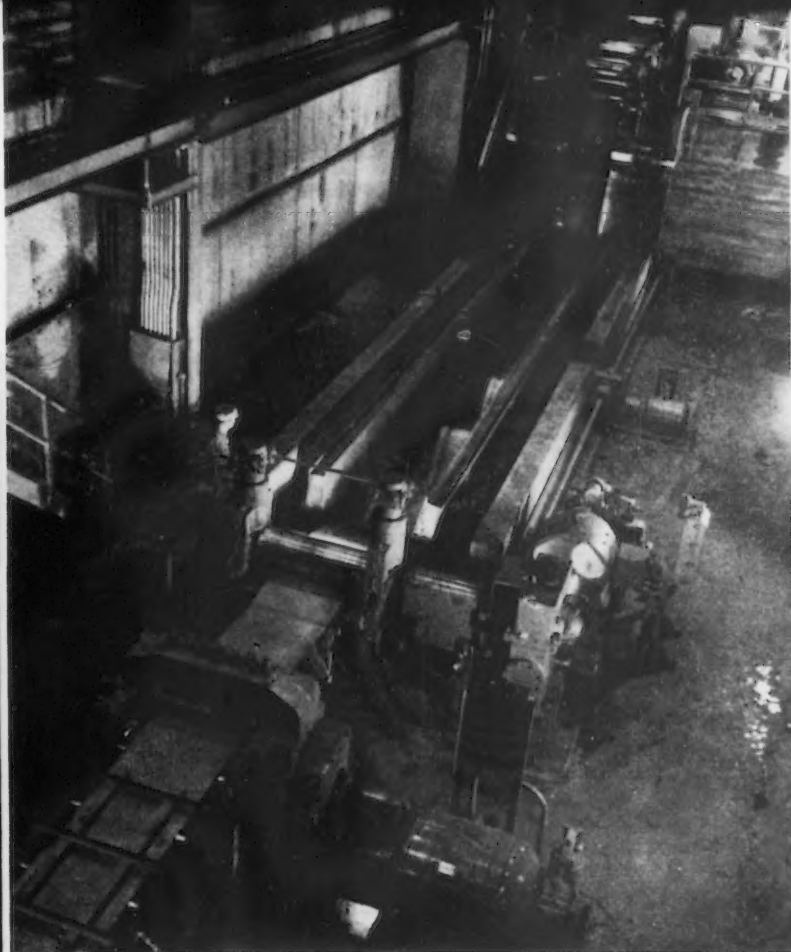
Board members point out that the Harris case is somewhat different from the Herman Loewenstein case where the NLRB previously refused to order an election involving a non-complying union.

"The Harris election was asked by an individual employee acting in his own interest," the Board explains, "whereas, an employer can ask an election only after a union has presented a claim to represent his employees."

RAPID-FIRE PRODUCTION: Part of a battery of new nail machines recently installed at the Aliquippa Works, Jones & Laughlin Steel Corp., the machine in the foreground can produce 400 nails per min—approximately the cyclic rate of fire of a .30 cal machine gun. These machines have an increase of 25 pct in productive capacity over old style machines, and a 15 pct increase in efficiency.



New J&L Five-Stand Tandem Cold Strip Mill Breaks Speed Records in Tests



ABOVE

The looping pit on the continuous pickle line at the Aliquippa Works, Jones & Laughlin Steel Corp., adjusts the flow of strip from the entry end units into the pickle tanks. The six mill and reel motors were built by General Electric.

LEFT

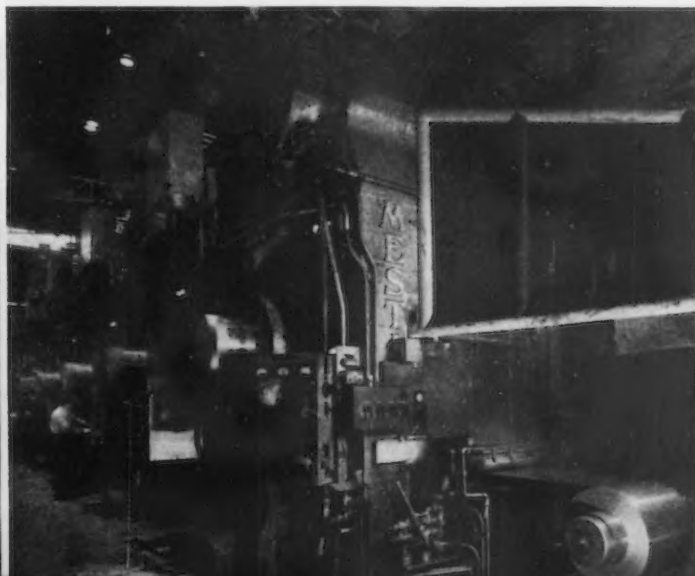
Begun in 1945, the new mill has been under wraps until recently when a series of test runs were started. The mill has already achieved a speed of 71 mph, the fastest speed known to have been attained by a steel rolling mill. Photo shows welding machine on entry end.

BELOW

Steel strip cold reduced is coiled on this tension reel. The finished coils have a 16 in. inside diam and up to 66 in. maximum outside diam, and weigh up to 30,000 lb. At top mill speed one of these coils is produced in about 5 min.

BELOW

Coil is shown being fed into the entry. Built by the Machine Co. of the heaviest construction of a tandem cold strip mill for tin plate gages, the new machinery weighs nearly 4000 tons and is stored in steel reinforced concrete foundations going down to bedrock 50 ft below ground level.



AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1948

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
† January	6,764,011	95.5	343,169	77.5	355,932	77.8	7,463,112	93.5	1,684,675	4.43
February										4.14
March										4.43
1st Quarter										13.00
April										4.29
May										4.43
June										4.29
2nd Quarter										13.01
1st 6 months										26.01
July										4.42
August										4.43
September										4.28
3rd Quarter										13.13
9 months										39.14
October										4.43
November										4.29
December										4.42
4th Quarter										13.14
2nd 6 months										26.27
Total										52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,599,286 net tons open hearth, 99,962 net tons Bessemer and 103,228 net tons electric ingots and steel for castings, total 1,802,476 net tons; based on annual capacities as of January 1, 1948 as follows: Open hearth 83,610,690 net tons, Bessemer 5,226,000 net tons, Electric 5,396,770 net tons, total 94,233,460 net tons.

* Revised.

† Preliminary figures, subject to revision.

YEAR 1947

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
February	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
March	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st Quarter	18,989,581	95.0	1,077,901	84.8	875,312	69.9	20,942,794	93.1	1,628,522	12.86
April	6,360,600	95.4	375,675	88.6	306,422	73.4	7,042,697	93.8	1,641,654	4.29
May	6,634,716	96.4	372,878	85.2	321,903	74.6	7,329,497	94.5	1,654,514	4.43
June	6,312,674	94.7	351,247	82.8	304,744	73.0	6,968,665	92.8	1,624,397	4.29
2nd Quarter	19,307,990	95.5	1,099,800	85.5	933,069	73.7	21,340,859	93.7	1,640,343	13.01
1st 6 Months	38,297,571	95.3	2,177,701	85.2	1,808,381	71.8	42,283,653	93.4	1,634,467	25.87
July	6,028,707	87.8	256,125	58.6	285,322	66.3	6,570,154	84.9	1,486,460	4.42
August	6,324,456	91.9	346,033	79.0	311,597	72.2	6,982,086	90.1	1,576,092	4.43
September	6,147,448	92.4	334,425	79.0	306,769	73.6	6,788,642	90.6	1,586,131	4.28
3rd Quarter	18,500,611	90.7	936,583	72.2	903,688	70.7	20,340,882	88.5	1,549,191	13.13
9 Months	56,798,182	93.7	3,114,284	80.8	2,712,069	71.4	62,624,535	91.8	1,605,757	39.00
October	6,826,543	99.2	384,272	87.8	349,520	81.0	7,560,335	97.5	1,706,622	4.43
November	6,538,179	98.1	360,620	85.0	334,236	80.0	7,233,035	96.3	1,686,022	4.29
* December	6,649,666	96.8	373,367	85.5	343,043	79.7	7,366,076	95.2	1,666,533	4.42
* 4th Quarter	20,014,388	98.0	1,118,259	86.1	1,026,799	80.3	22,159,446	96.4	1,686,411	13.14
* 2nd 6 months	38,514,999	94.4	2,054,842	79.1	1,930,487	75.5	42,500,328	92.5	1,617,827	26.27
* Total	76,812,570	94.8	4,232,543	82.1	3,738,868	73.7	84,783,981	92.9	1,626,083	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

* Revised.

Weekly Gallup Polls . . .

Countries Little Impressed by Soviet Accusations Against U. S.

Princeton, N. J.

••• Russian accusations of "imperialistic warmongering" against the United States do not seem to be making much impression on the minds of other countries, according to George Gallup, director, American Institute of Public Opinion.

In fact, a survey of public opinion in seven foreign nations, five of them in Europe, shows that the majority of the people think that it is Russia, not the United States, which would likely start a war of aggression.

This survey indicates that in the struggle going on between Washington and Moscow to influence men's minds throughout the world, the United States is not doing too badly. We are associated in the minds of the majority of people with the symbols of peace and goodwill, rather than self-aggrandizement.

In seven nations—France, Holland, Italy, Sweden, Norway, Canada and Brazil—voters were asked two questions concerning the motives of Russia and the motives of the United States. The surveys in each nation were conducted at approximately the same time during the month of January.

The first question was:

"Do you think Russia would start a war to get something she wanted (such as more territory or more resources)—or would she fight only if attacked?"

Here is the vote in the seven foreign nations, and also in the United States, where the same poll was conducted:

	Would Start War	De- fense Only	No opin.
	Pct	Pct	Pct
U.S.A.	73	19	8
Canada	60	26	14
Holland	57	27	16
France	51	22	27
Italy	50	17	33
Brazil	43	16	41
Sweden	42	21	37
Norway	37	37	26

In sharp contrast to the above

are the opinions of the same countries on the question whether the United States would start a war to get something she wanted.

"Do you think the United States would start a war to get something she wanted (such as more territory or more resources)—or would she fight only if attacked?"

The vote:

	Would Start War	De- fense Only	No opin.
	Pct	Pct	Pct
Norway	23	55	22
France	20	56	24
Holland	16	60	24
Italy	16	48	36
Canada	13	77	10
Sweden	13	54	33
Brazil	9	53	38
U.S.A.	5	92	3

The surveys brought out the fact that in countries where the Communist Party is of importance numerically, the vote of the Communists is overwhelmingly favorable to Russia and unfavorable to the United States.

In France, for example, 83 pct of Communists said that Russia would never go to war except in self-defense, while 69 pct said that the United States would go to war to get something she wanted. The Communists were the only party in France to express this view.

In Holland, too, the Communists polled said that Russia would only fight in self-defense whereas the United States would fight for self-aggrandizement. In Italy the same pattern of thinking was also found. In both countries the Communists were the only party expressing those views, all other parties taking the opposite view.

••• Lend-lease shipments to Russia by the American government are opposed by a large majority of American voters. Popular coolness toward the Soviets has also reached the point where even the sale of products by private American business firms to Russia is questioned by the majority.

Majority of American Voters Oppose Lend-Lease Shipments To Russia; Favor Halting Trade

Soviet Ambassador Alexander Panyushkin recently complained that "American regulating trade agencies" are discriminating against trade to his country.

A survey completed just before the ambassador stated his case shows that seven out of ten American voters want business firms in this country to stop shipments to Russia at once. Five of the seven hold very strong views on the subject.

Public sentiment on commercial relations with the Soviet is almost identical with opinion on official U. S. government exports.

A representative cross-section of voters throughout the country was asked this question:

"American business firms are now selling oil, machinery, and industrial products to Russia. Do you think business firms should stop selling these things to Russia—or should they continue to sell these things to her?"

The national averages:

	Pct
Stop selling	72
Continue selling	15
No opinion	10
Qualified	3

A separate but comparable cross-section of voters was asked a question concerning strictly lend-lease shipments as follows:

"The U. S. government has been sending oil, machinery and industrial products to Russia under our lend-lease program. Do you think the government should stop sending these things to Russia—or should it continue to send these things to her?"

	Pct
Stop	83
Continue selling	8
No opinion	6
Qualified	3

The principal qualifications in
(CONTINUED ON PAGE 140)

Industrial Briefs . . .

• **PLANT RECONVERSION** — The Kaiser-Fraser Corp., has informed WAA that it will spend about \$2 million reconverting the surplus blast furnace, sintering plant and 500 coke ovens it purchased, located at Ironton, Utah. It expects to have the facilities in operation by May of this year. The properties, which were operated by Columbia Steel during the war, have a capacity of 750 tons of beehive coke per day and 300,000 net tons of pig iron per year, and have been idle since February 1944.

• **JOINS BATTELLE** — Hugo E. Johnson has joined the staff of Battelle Memorial Institute. He will be in charge of coordinating the research activities of the institute with the industry and will act in a liaison capacity to the iron and steel industry.

• **CONSULTANT** — Thomas J. Llewellyn has resigned from United Engineering & Foundry Co. and has set up a consulting engineering service at 609 Commonwealth Annex, Pittsburgh 22. He specializes in design and layout of steel plants.

• **TO HEAD GROUP**—R. W. Langenbach, president of the Berger Metal Culvert Co., Westminster, Vt., has been elected president of the Toncan Culvert Manufacturers Assn.

• **ELECTS OFFICERS**—D. R. Simmons official of both the Elberta Crate & Box Co., Bainbridge and Tallahassee, Fla., and the Southern Crate & Veneer Co., Macon, Ga., was elected president of the Wirebound Box Manufacturers Assn. for 1948. E. S. Barnhill of the Indianapolis Wire Bound Box Co., Indianapolis, was elected vice-president.

• **BEARING WAREHOUSE** — The Fafnir Bearing Co., New Britain, Conn., has acquired a one-story building at 801-811 East 20th St., Indianapolis, to serve as a warehouse and sales office quarters, consolidating its St. Louis and Indianapolis offices.

• **CARIBBEAN OUTLET**—The Avco Mfg. Corp., Cincinnati, has announced the appointment of Jules Farmer as Crosley distributor in Port-au-Prince, Haiti.

• **DENVER BRANCH** — Hagan Corp., Pittsburgh combustion and chemical engineering firm, has opened a branch office at 2018 Blake St., Denver, with W. C. Bennett as district manager.

• **TO BUILD CHEMICAL PLANT**—B. F. Goodrich Chemical Co., Cleveland, will construct a new \$3 million general chemical plant in Avon Lake, Ohio. Construction is scheduled to begin this spring or early summer.

• **SOUTHERN WAREHOUSE**—Hewitt-Robins Inc. has leased a warehouse at 1010 Pennsylvania Ave., Charleston, W. Va., to serve its conveying machinery customers in the South.

• **NEW QUARTERS**—Cutler-Hammer, Inc., Milwaukee, electrical manufacturers, has announced new and expanded quarters for their San Francisco sales office and manufacturing plant at 2130 Third St.

• **DETROIT OFFICE** — A direct sales and service office for the state of Michigan has been opened in the New Center Bldg., Detroit by the R. K. LeBlond Machine Tool Co., Cincinnati, lathe manufacturers. Oscar P. Noe will be in charge of this new office and assisting him will be Joseph Gebel and Clason Shumard.

• **METAL CLEANERS**—The Cowles Detergent Co., Cleveland has announced the appointment of the Sessions-Gifford Co., Inc., of Providence and Boston as distributors of alkaline and emulsion solvent type metal cleaners.

• **TO INCREASE OUTPUT** — A \$600,000 improvement program to increase production of equipment needed to help alleviate the shortage of natural gas has been authorized by directors of Cooper-Bessemer Corp., Mt. Vernon, Ohio.

Reynolds Warns That Aluminum for Planes May Not Be Available

New York

• • • Commenting on the Air Policy Commission's report to the President, R. S. Reynolds, president Reynolds Metals Co., New York, warned that aircraft aluminum is not immediately available and that without long range government planning the aluminum industry will be unable to assure the quantities which the Commission holds essential.

The timetable for plane construction advocated by the Commission calls for increased plane production immediately. With aluminum still accounting for 75 pct of a plane's weight, increased production called for in the report would require 116 pct more aluminum over the next two years than manufacturers are now getting. This means that the aluminum industry would be called on for 36 million more pounds of fabricated aluminum than has been ordered up to the present.

Availability of this tonnage is uncertain as the industry is already operating at capacity with demand well ahead of supply, according to Reynolds. Housing and transportation equipment demands are leaving no idle stocks immediately available to the plane manufacturers.

"Long range procurement policies alone cannot guarantee the kind of aluminum industry to best serve the national air policy," said Reynolds. "Aluminum tariffs are so low that they forced this country's aluminum industry to cut production at the very time that plans for aircraft are being accelerated, as the Canadian producer has flooded the market when it was already oversupplied and practically stopped shipments when its metal was most needed. When such shipments fluctuate from 50,400 to 11,900,000 lbs a month, as they did between May and October 1947 intelligent planning by the aluminum industry of this country becomes practically impossible."

Air Force officials consider aluminum acquisition a Munitions Board problem, at least insofar as a program to insure an adequate supply for aircraft is concerned.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

- 2400 Tons, Omaha, veterans' hospital through U. S. Engineers to American Bridge Co., Pittsburgh.
- 360 Tons, Washington, Pan American Union Building, through Turner Construction Co., Philadelphia, to Bethlehem Steel Co., Bethlehem.
- 285 Tons, Tacoma, Wash., channel construction, Puyallup River, Seattle District Corps of Engineers, Ser. W-45-108-eng-48-30, through Manson Construction & Engineering, to Poole, McGonigle & Dick, Portland, Ore.
- 255 Tons, Atlanta, Electric Storage Battery Co., building, to Bethlehem Steel Co., Bethlehem.
- 185 Tons, Laurelton, L. I., Laurelton telephone building, through Iron & Reynolds, Inc., to Grand Iron Works Inc., New York.
- 120 Tons, Brooklyn, new generator building at Brooklyn Borough Gas Co. through Christie & Leiser, Inc. to Grand Iron Works Inc., New York.
- 100 Tons, Palmerton, Pa., Pennsylvania Power & Light Co., to Bethlehem Steel Co., Bethlehem.

• • • Fabricated steel inquiries this week included the following:

- 2200 Tons, Kingham, Ariz. Transmission Lines, U. S. Bureau of Reclamation, Bids close Mar. 11.
- 1700 Tons, Franklin Park, Ill., factory building for J. Emil Anderson & Son.
- 700 Tons, Whiteside County, Ill., bridge section TF-MFT for the State of Illinois.
- 430 Tons, Glasgow, Va., building for James Lees & Sons, bids in.
- 300 Tons, Philadelphia, refinery storehouse for Gulf Oil Co., due Feb. 23.
- 225 Tons, Coconino County, Ariz., steel bridge and overpass structure, Ash Fork-Flagstaff highway, near Flagstaff, Arizona State Highway Commission, Phoenix, bids to Feb. 20.
- 185 Tons, Camden, N. J., Pennsylvania-Reading Seashore Lines, bids in.
- 100 Tons, Philadelphia, Delaware County hospital, bids in.

• • • Reinforcing bar awards this week included the following:

- 4285 Tons, Los Angeles, Los Angeles River improvement, Lankershim Blvd. to Vine-

land Ave., through Bressi & Bevanda Constructors, Inc. to Bethlehem Steel Co., Bethlehem.

- 620 Tons, Los Angeles, undercrossing and overcrossing, Hollywood Parkway and Virgil Ave. at Hoover and Rosemont, through Spencer Webb to Soule Steel Co., San Francisco.

• • • Reinforcing bar inquiries this week included the following:

- 410 Tons, Chicago, warehouse for the William Wrigley Co.
- 200 Tons, Hammond, Ind., administration building for Standard Oil Co., Inc. Bids close Feb. 24.
- 175 Tons, Indianapolis, Michigan Ave. bridge, Smith & Johnson Co., Indianapolis, low bidder.
- 110 Tons, San Bernardino County, Calif., highway construction between Plunge Creek and Long Point, California Div. of Highways, Los Angeles, bids to Mar. 11.

• • • Rail orders this week included the following:

- 14,000 Tons, to Tennessee Coal, Iron & R.R. Co., Birmingham, from Central of Georgia Ry. Co.
- 11,000 Tons, to Tennessee Coal, Iron & R.R. Co., Birmingham, from Florida East Coast Ry.

Engineers, Technicians And Scientists Will Convene in Chicago

Chicago

• • • Forty - seven engineering, technical and scientific associations will gather in Chicago Mar. 22 to 24, inclusive, for a 3-day convention sponsored by the Chicago Technical Societies Council. The technical meetings and panels will be combined with a show to be held in the Stevens Hotel here.

The metals section has three interesting panels scheduled under the auspices of ASM for Mar. 23. A morning session on "Modern Trends in Heat Treatment" is scheduled with A. S. Jamison of International Harvester as the chairman of the panel. Induction heat treatment and isothermal heat treatment will be included in this panel.

In the afternoon, a panel on alloys for high temperature service will be held under the chairmanship of William E. Mahin, chief of the metals section of Armour Research Foundation of Chicago. Jet engine design will also be discussed at this panel.

For the evening meeting of this series the subject will be "Atomic Energy and the Metallurgist." Dr. Bruce S. Old, chief of the metal-

lurgical and materials research division of the Atomic Energy Commission, will be the chief speaker.

Registration for the convention

can be had through Royal L. Stapleton, chairman of the conference committee of the Chicago Technical Societies Council at 53 W. Jackson Blvd., Chicago.

Coming Events

- Feb. 28, March 1-2 American Metallizing Contractors Assn., meeting, Cleveland.
- Mar. 1-4 American Society of Mechanical Engineers, meeting, New Orleans.
- Mar. 3-5 Society of Automotive Engineers, national passenger car meeting, Detroit.
- Mar. 15-19 ASTE Industrial Exposition, Cleveland.
- Mar. 18-19 Magnesium Assn., annual meeting, New York.
- Apr. 5-8 Southern Machinery and Metals Exposition, Atlanta.
- Apr. 5-8 National Assn. of Corrosion Engineers, annual conference and exhibition, St. Louis.
- Apr. 7-9 American Society of Civil Engineers, meeting, Pittsburgh.
- Apr. 12-14 Openhearth Steel Committee and Coke Oven, Blast Furnace and Raw Materials Committee, AIME, annual conference, Pittsburgh.
- Apr. 15-16 Metal Powder Assn., annual meeting and exhibit, Chicago.
- Apr. 19-21 American Society of Lubrication Engineers, convention and exhibition, Buffalo.
- Apr. 19-23 American Chemical Society, national meeting, Chicago.
- Apr. 22-23 Westinghouse Electric Corp., Machine Tool Forum, Buffalo.
- May 3-7 American Foundrymen's Assn., convention and show, Philadelphia.
- May 20-21 Society of the Plastics Industry, annual meeting, Atlantic City, N. J.
- May 26-27 American Iron & Steel Institute, meeting, New York (restricted to members only).
- May 27-29 Society for Experimental Stress Analysis, meeting, Pittsburgh.

Canadian Steel Output Hits Near Capacity But Falls Short of Demand

Toronto

• • • In spite of many operating problems and raw material shortages the Canadian iron and steel industry is making favorable progress toward meeting the abnormal demand for its products. Production is being maintained at virtual capacity insofar as raw materials are concerned, but despite this fact there is not sufficient steel available to meet all the requirements of rolling departments.

Canada is still facing a serious steel shortage and there are no indications that supply will catch up with demand during the current year. Mills have opened books for second quarter business, and

are making known delivery quotas to various customers to the end of June, but it is not expected there will be much improvement in tonnages during the second quarter over the first three months this year.

Under pressure of the big increase in demand for steel during the war years Canada made an enviable record in expanding production capacity. H. G. Hilton, president of the Steel Co. of Canada Ltd., stated that in 1942 output of ingots and castings rose to 3,110,000 tons, over twice as much as in 1939, and far more than in any previous year. This was a noteworthy feat when it is considered that even a moderate increase in capacity, for such a closely integrated industry as steel, affects almost every phase of intricately combined operations.

some of which, such as the mining of ore and coal, and the manufacture of coke and pig iron represent most important undertakings in themselves, and demand very careful planning and organization. According to Hilton, no country in the world has matched this performance, with the peak increase over 1939 in the United States occurring two years later than in Canada, in 1944, and equalling 70 pct.

However, some falling off in production from 1942 had to be expected, as Canada had then reached the limit of her manpower. Still the level of output in every year since 1942 has been high, except in 1946 when a strike lowered production.

For 1947, output of steel ingots and castings totalled almost 3 million tons. This is within 5 pct of the most active of the war years, and it must be remembered that in contrast with war time, holidays and vacations with pay have been reinstated, scrap is in limited supply and has deteriorated in quality, and the average grade of coal and coke is subnormal.

For the last five years, 1943 to 1947 inclusive, 14½ million tons of steel were produced in Canada, compared with 6¾ millions in the five years, 1935-39, immediately preceding the war. This represents an increase of 111 pct.

Total ingot capacity, as compiled by the Dominion Bureau of Statistics, is placed at 3,245,000 net tons a year. In case this comparatively high figure should cause any misgivings about the full utilization of steelmaking facilities in Canada, Hilton pointed out that it is theoretical and includes furnaces, some of them very old, which are not operated continuously. It also covers some electric furnaces which produce intermittently and are used for the manufacture of alloys of special qualities. Effective steel ingot capacity would hardly exceed 3 million tons annually. The steel industry is still under Government control, and it may safely be said that Canada is producing every ton of steel that is economically possible, practically all of which is being processed in this country, as exports are subject to permit and very little basic steel is leaving the country.

Capacity for the production of
(CONTINUED ON PAGE 141)

50 YEARS AGO

THE IRON AGE, February 17, 1898

• "The heat motor designed by R. Diesel of Munich, Germany, marks a wide departure from the usual practice. Combustion is effected by the heat arising from compressing air. Absolutely perfect combustion is claimed. The economy of the motor has been proven to be more than twice that of the best and largest steam engines and 1½ times that of the best gas engines."

• "The General Electric Co., 44 Broad St., New York, has developed a line of small hp motors developing as low as 1 hp. These new motors closely follow the design of standard GE electric railway motors."

• "Engineers and railway men are much interested in the results of tests now being made abroad with mats of felt which are designed for laying under the rails of street railway lines for cushioning and sound deadening."

• "Those who are familiar with the steps taken to form a consolidation of the wire rod and

wire interests say that much credit should be given to Gerrett H. Ten Broeck of St. Louis, who originally obtained options on most of the companies and interested capitalists in the project."

• "The committee which is endeavoring to consolidate the tin plate interests in this country met in New York last week. The combination, if effected, will doubtless have a tendency to raise prices."

• "Mayor Harrison of Chicago has issued notice to the telegraph and telephone companies in that city that some 4000 overhead wires in the downtown district will be cut down by the city unless steps are taken to place them underground before March 1."

• "Iron manufacturers have generally taken a deep interest in the rapid growth of the use of steel in car construction. To some extent, large steel freight cars are experimental, since many factors enter into the settlement of the problems which only protracted experience can determine."

The Iron Age Metalworking Buyers' Guide

... A fifth section of the Buyers' Guide is presented herewith. The first section of this directory appeared in the Annual Review Issue, Jan. 1, 1948, p. 208. This guide has been developed to give executives and purchasing agents of the metalworking industry a directory with a much finer breakdown in classifications than has been heretofore available. Additional sections of the guide will be published weekly.

C

Continued

Sinclair Refining Company, 630 Fifth Ave., New York 20.

SOCONY-VACUUM OIL CO., INC., 26 Broadway, New York 4.

Stuart Oil Co., Ltd., D. A., 2727 S. Troy St., Chicago 23.

United Industrial Products, Inc., Div. Adam Cook's Sons, Inc., Linden, N. J.

Compounds, Lapping

Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.

Formax Mfg. Co., 3000 Bellevue St., Detroit 7.

Koebel Diamond Tool Co., 9456 Grinnell Ave., Detroit 13.

Mangus Chemical Co., South Ave., Garwood, N. J.

Puritan Manufacturing Co., Waterbury, Conn.

Quaker Chemical Products Corp., Conshohocken, Pa.

Stuart Oil Co., Ltd., D. A., 2727 S. Troy St., Chicago 23.

United Industrial Products, Inc., Div. of Adam Cook's Sons, Inc., Linden, N. J.

Compounds, Soldering and Welding

AMERICAN BRAKE SHOE CO., CASTINGS, 230 Park Ave., New York 17.

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5.

Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

General Welding & Equipment Co., 268 Northampton St., Boston 18.

Kano Laboratories, 65 E. Wacker Dr., Chicago 1.

Mangus Chemical Co., South Ave., Garwood, N. J.

Marquette Mfg. Co., Inc., 307 E. Hennepin St., Minneapolis 14.

NATIONAL LEAD CO., 111 Broadway, New York 6.

Smith & Sons, G. W., 5400 Kemp Rd., Dayton 3.

Turco Products, Inc., P. O. Box 2649 Terminal Annex, Los Angeles 54.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh, Pa.

Compressors, Air

AMERICAN BRAKE SHOE CO., CASTINGS, 230 Park Ave., New York 17.

East Manufacturing Corp., Benton Harbor, Mich.

Bellows-Senacon Co., 798 N. Main St., Akron 10, Ohio.

BOTWINIK BROS. OF MASS., INC., 5 Sherman St., Worcester 1.

Brunner Mfg. Co., 1821 Broad St., Utica 1, N. Y.

Chicago Pneumatic Tool Co., 8 E. 44th St., New York 17.

COOPER BESSEMER CORP., Mt. Vernon, Ohio.

Crawford & Co., Inc., F. H., 30 Church St., New York 7.

DAVEY COMPRESSOR, Kent, Ohio.

DeLaval Steam Turbine Co., Trenton 2, N. J.

Dumore Co., 506 14th St., Racine, Wis.

Eclipse Fuel Engineering Co., 814 S. Main St., Rockford, Ill.

Gardner-Denver Co., 100 Williamson St., Quincy, Ill.

General Machinery & Equipment Co., 180 So. 15th, Harrisburg, Pa.

Ingersoll-Rand Co., 11 Broadway, New York 4.

Interstate Machinery Co., 1435 W. Pershing Rd., Chicago 9.

Joy Manufacturing Co., Sullivan Division, Michigan City, Ind.

Knox Co., Earl E., 8 West 2nd St., Erie, Pa.

Metallizing Engineering Co., 38-14 30th St., Long Island City 1, N. Y.

Miles Machinery Co., 2025 E. Genesee Ave., Saginaw, Mich.

Simmons Machine Tool Corp., Albany 1.

SPENCER TURBINE CO., 497 New Park Ave., Hartford 6.

West Penn Machinery Co., 1210 House Bldg., Pittsburgh 22.

Westinghouse Air Brake Co., Industrial Division, Wilmerding, Pa.

Wilson, R. K., 215 Main St., Buffalo 3.

Compressors, Gas

Allen Billmyre Co., 431 Fayette Ave., Mamaroneck, N. Y.

ALLIS-CHALMERS MFG. CO., 1126 So. 70th St., Milwaukee 1.

American Brake Shoe Co., 230 Park Ave., New York 17.

Gardner-Denver Co., 100 Williamson St., Quincy, Ill.

Ingersoll-Rand Co., 11 Broadway, New York 4.

Interstate Machinery Co., 1435 W. Pershing Rd., Chicago 9.

Jack & Heintz, Inc., Cleveland 1.

Joy Manufacturing Co., Sullivan Division, Michigan City, Ind.

Knox Co., Earl E., 8 West 2nd St., Erie, Pa.

MESTA MACHINE CO., P. O. Box 1466, Pittsburgh 30.

Pennsylvania Pump & Compressor Co., P. O. Box 389, Easton, Pa.

Simmons Machine Tool Corp., Albany 1.

Westinghouse Electric Corp., P. O. Box 868, East Pittsburgh, Pa.

Wilson, R. K., 215 Main St., Buffalo 3.

Condensate Return Systems

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32.

Condensers

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32.

Consolidated Steel Corp., Arcade Station, Los Angeles.

Fedders-Quigan Corp., Buffalo 7.

Frick Co., Waynesboro, Pa.

LEHIGH FOUNDRIES, INC., Easton, Pa.

McChord Corp., Grand Blvd., Detroit.

Ross Heater & Mfg. Co., Inc., 1436 West Ave., Buffalo, N. Y.

Struthers-Wells Corp., Warren, Pa.

Vilter Mfg. Co., So. First St., Milwaukee.

Vogt Machine Co., Henry, Ormsby St., Louisville.

Worthington Pump & Machinery Co., Harrison, N. J.

York Corp., York, Pa.

Young Radiator Co., Racine, Wis.

Conditioners, Feedwater

ALLIS-CHALMERS MFG. CO., Ristow St., Milwaukee 1.

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32.

Crane Co., 845 So. Michigan Ave., Chicago.

Permutit Co., 330 W. 42nd St., New York.

Rumford Chemical Works, Newman St., Rumford, R. I.

Conduit Fittings

AMERICAN METAL HOSE DIV., AMERICAN BRASS CO., Ambac Bldg., Waterbury, Conn.

American Phenolic Corp., Chicago 50.

Appleton Electric Co., 1701-1729 Wellington Ave., Chicago.

GENERAL ELECTRIC CO., Schenectady 5, N. Y.

Graybar Electric Co., Inc., Graybar Bldg., New York.

REPUBLIC STEEL CORP., Steel & Tubes Div., Cleveland 1.

Conduit, Shielded

Anaconda Wire & Cable Co., 25 Broadway, New York.

Breeze Corp., So. 6th St., Newark, N. J.

Crescent Insulated Wire & Cable Co., Taylor St., Trenton, N. J.

Essex Wire Corp., Wall St., Ft. Wayne, Ind.

GENERAL ELECTRIC CO., Schenectady 5, N. Y.

LACLEDE STEEL CO., Arcade Bldg., St. Louis.

Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.

Contacts, Electrical

ALLIS-CHALMERS MFG. CO., 1126 So. 70th St., Milwaukee 1.

Baker & Co., Inc., 113 Astor St., Newark 5, N. J.

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5.

BOTWINIK BROS. OF MASS., INC., (New and Used), 5 Sherman St., Worcester 1.

Chicago Pneumatic Tool Co., 8 E. 44th St., New York 17.

CUTLER-HAMMER, INC., 1262 St. Paul Ave., Milwaukee 1.

DeLaval Steam Turbine Co., Trenton 2, N. J.

Hyndman, A. H., Co., Inc., 9605 Cottage Grove Ave., Chicago 28.

Indianapolis Machy. & Sup. Co. (Distributors), 1959-69 S. Meridian St., Indianapolis 6.

Keystone Carbon Co., Inc., 1935 State St., St. Mary's Pa.

MALLORY, P. R., & CO., INC., 3029 E. Washington St., Indianapolis 6.

Miles Machinery Co., 2025 E. Genesee Ave., Saginaw, Mich.

NATIONAL CARBON CO., INC., 30 E. 42nd St., New York 17.

Pittsburgh Carbon Brush Co., 801 Fulton St., Pittsburgh 12.

Ritterbush & Co., Inc., 50 Church St., New York 7.

ROOTS-CONNSVILLE BLOWER CORP., Connersville, Ind.

Sherman & Co., 196 Canal St., New York 13.

Stackpole Carbon Co., St. Marys, Pa.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh.

Contour Measuring Projectors

Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.

BOTWINIK BROS. OF MASS., INC., (New and Used), 5 Sherman St., Worcester 1.

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IN THE complete STAR line, there's a STAR blade for every kind of job and whatever the job, you'll find your hack saw or band saw doing it better with a STAR blade.

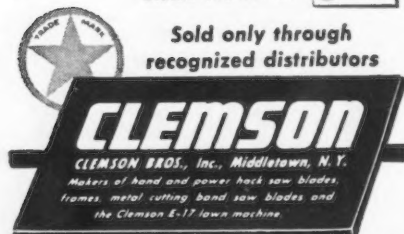
Tell your supplier what you want. Let him select your blade or frame from the complete STAR performance-proved line. You'll have a faster, cleaner cutting, longer lasting blade; you'll have the right blade, a STAR BLADE!



Ask your supplier for "Metal Cutting" free booklet on care, use and selection of band and hack saw blades and frames.



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BUYERS GUIDE

Portman Machine Tool Co., 70 Portman Rd., New Rochelle, N. Y.

Contour Millers

Coulter, James, Machine Co., Railroad Ave., Bridgeport 5, Conn.

Farnham Mfg. Co., Seneca St., Buffalo 10, N. Y.

Fitchburg Engineering Corp., Fitchburg, Mass.

Frew Machine Co., 118 Luray St., Philadelphia.

Gorton, George, Machine Co., 1111 W. 13th St., Racine, Wis.

KEARNEY & TRECKER CORP., 6789 W. National Ave., Milwaukee 14.

Le Maire Tool Co., 2665 S. Telegraph Rd., Dearborn, Mich.

MOREY MACHINERY CO., 410 Broome St., New York 13.

Rowbottom Machine Co., Archer St., Waterbury, Conn.

SNYDER TOOL & ENGINEERING CO., 3415 E. Lafayette Ave., Detroit.

SUNDSTRAND MACHINE TOOL CO., 2550 11th St., Rockford 2, Ill.

Thompson, Earl A., Co., Ferndale, Mich.

VAN NORMAN CO., 3590 Main St., Springfield, Mass.

Control Equipment, Electroplating

Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4.

Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4483 Wayne Ave., Philadelphia 44.

Crown Rheostat & Supply Co., 3465 N. Kimball Ave., Chicago 18.

Korcor Co., 4800 S. St. Louis Ave., Chicago.

PORTABLE PRODUCTS CORP., Pittsburgh.

Powers Regulator Co., 2706 W. Greenview Ave., Chicago 14.

U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11.

Wagner Litho Machine Div., National Standard Co., Harborside Terminal, Unit 3, Jersey City 2, N. J.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh.

Control Systems, Motor Speed

Adams & Westlake Co., Elkhart, Conn.

Arrow-Hart & Hegeman Electric Co., Peck St., Hartford, Conn.

Bristol Co., Instrument Div., Waterbury, Conn.

Federal Electric Products Co., Paris St., Newark, N. J.

Kimble Electric Co., 2027 W. Hastings St., Chicago.

Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.

Weltronic Company, 19500 W. 8 Mile Road, Detroit 19.

Control Equipment, Steel Mill

Askania Regulator Co., 1603 S. Michigan Ave., Chicago 16.

Control Systems, Record

INTERNATIONAL BUSINESS MACHINE CORP., 590 Madison Ave., New York 22.

REMINGTON RAND CO., Buffalo, N. Y.

Control Systems, Temperature

Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44.

Brown Instrument Co., Div. of Minneapolis-

• Every company in the metal-working industry is urged to check this section of the new IRON AGE Metalworking Buyers' Guide, and send in corrections and additions to assure complete accuracy in the first reprint of the directory. Forward corrections to THE IRON AGE, Attention Buyers' Directory, 100 E. 42nd St., New York 17.

Honeywell Regulator Co., 4483 Wayne Avenue, Philadelphia 44.

Carrier Corporation, 300 So. Geddes St., Syracuse 1, N. Y.

Engelhard, Charles, Inc., 90 Chestnut St., Newark 5, N. J.

Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11.

Keckley, O. C., Co., Springfield, Ill.

KOPPERS COMPANY, INC., Koppers Bldg., Pittsburgh 19.

LEEDS & NORTHRUP CO., 4956 Stenton Ave., Philadelphia 44.

MASTER ELECTRIC CO., Industrial Equipment Div., 126 Davis Ave., Dayton 1.

Minneapolis-Honeywell Regulator Co., 2706 4th Ave., So., Minneapolis 8.

Perflex Corp., 500 W. Oklahoma Ave., Milwaukee 7.

Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia 30.

Powers Regulator Co., 2706 W. Greenview Ave., Chicago 14.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh.

Controlled Atmosphere Dryers

Bartlett, C. O., & Snow Co., 6200 Harvard Ave., Cleveland 5.

Carrier Corp., 300 So. Geddes St., Syracuse 1, N. Y.

Continental Industrial Engineers, Inc., 170 W. Adams St., Chicago 3.

Robinson Ventilating Co., Zelenople, Pa.

Rockwell, W. S., Co., 200 Eliot St., Fairfield, Conn.

Trane Co., La Crosse, Wis.

Wagner Litho Machine Div., National Standard Co., Harborside Terminal, Unit 3, Jersey City 2, N. J.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh.

Controllers, Electric

Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4.

ALLIS-CHALMERS MFG. CO., 1126 So. 70th St., Milwaukee 1.

Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44.

Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4483 Wayne Ave., Philadelphia 44.

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32.

CUTLER-HAMMER, INC., 1262 St. Paul Ave., Milwaukee 1.

ELECTRIC CONTROLLER & MFG. CO., 2698 E. 79th St., Cleveland 4.

Electric Machinery Mfg Co., 1331 N.E. Tyler St., Minneapolis 13.

Indianapolis Machinery & Supply Co. (Distributors), 1959-69 S. Meridian St., Indianapolis 6.

Lear, Inc., 110 Ionia Ave. N.W., Grand Rapids 2.

LEEDS & NORTHRUP CO., 4956 Stenton Ave., Philadelphia 44.

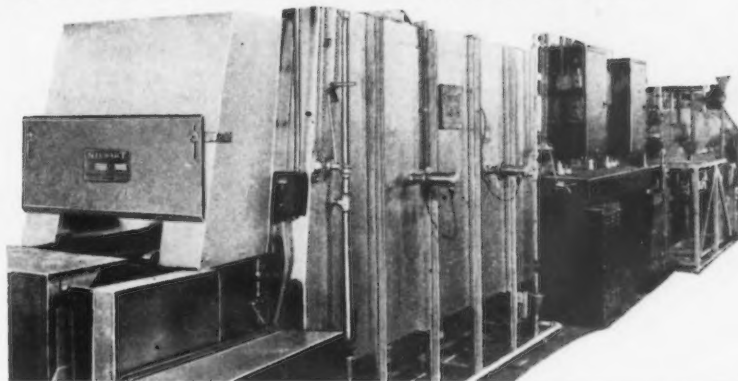
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of a
Series
of Typical
Installations

Sunbeam STEWART

THE BEST INDUSTRIAL FURNACES MADE

ELECTRIC FURNACE BRAZING AIDS MASS PRODUCTION AT SUNBEAM

A variety of Sunbeam products are copper brazed, silver soldered, and bright annealed in this versatile Sunbeam Stewart Continuous Electric Brazing unit. Result: Increased production, lower operating cost and improved quality.



AS A division of the Sunbeam Corporation, Sunbeam Stewart has the practical advantage of designing furnaces used in the parent plant, and to work closely with its heat treating problems. This experience with Sunbeam Stewart Furnaces in large volume production

enables us to render a service far beyond other furnace manufacturers—a position unique in the furnace manufacturing field. That is one reason why Sunbeam Stewart installations have been so successful.



This Sunbeam Stewart Electric Brazing Furnace is used for bright annealing the Rain King Sprinkler base (above, left) during forming. This base requires no further cleaning before the final surface treatment is applied. The wing set screw of the Clipmaster (top left, center) is copper brazed from two sections. The versatile unit is also used for silver soldering the Rain King hose nozzle (top right, center). Screw cap and stem are pro-

duced separately from high strength brass bar stock and then silver soldered. For the Shavemaster (center, below) a liquid copper brazing solution is painted on the area of the clip which is later brazed to the larger part. The entire base of the Sunbeam Mixmaster (above, right) is assembled by brazing. A bright sheen of the brazed base shows the protection given by the furnace atmosphere.

SUNBEAM STEWART INDUSTRIAL FURNACE DIVISION of SUNBEAM CORPORATION

(Formerly CHICAGO FLEXIBLE SHAFT CO.)

Main Office: Dept. 110, 4433 Ogden Ave., Chicago 23 — New York Office: 11 W. 42nd St., New York 18 — Detroit Office: 308 Boulevard Bldg., Detroit
Canada Factory: 321 Weston Rd., So., Toronto 9

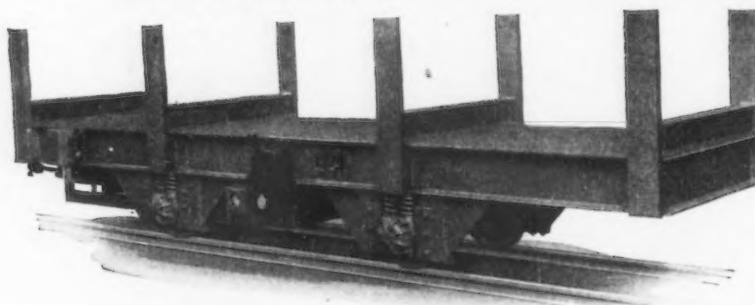
A letter, wire or 'phone call will promptly bring you information and details on SUNBEAM STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a SUNBEAM STEWART engineer will be glad to call and discuss your heat treating problems with you.

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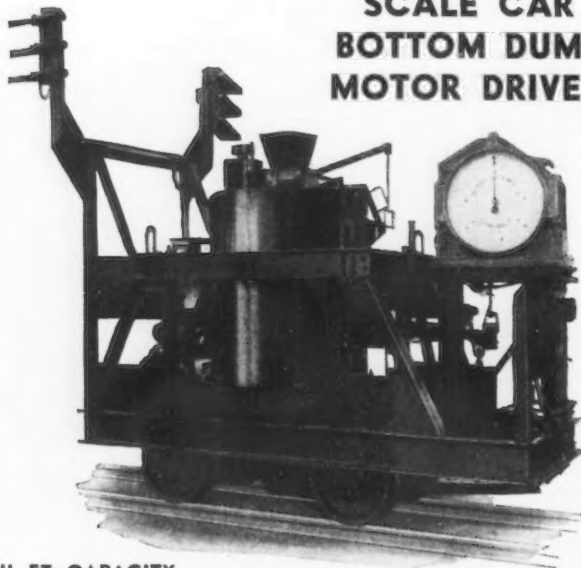
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Minneapolis-Honeywell Regulator Co., 2730 4th Ave. So., Minneapolis 8.

Nankervis, Geo. L., Co., 5442 Second Blvd., Detroit 2.

Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7.

Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.

PORTABLE PRODUCTS CORP., Pittsburgh.

Precision Thermometer & Instr. Co., 1414 Brandywine St., Philadelphia 30.

Rowan Controller Co., 2315 Homewood Ave., Baltimore 18.

Synchro-Start Products, Inc., 1046 West Fullerton Ave., Chicago 14.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh, Pa.

Yardney Laboratories, Inc., 105-107 Chambers St., New York 7.

Controllers, Flow, Liquid Level

Builders-Providence, Inc., 9 Coddling St., Providence 1.

Cash, A. W., Co., Decatur, Ill.

Cochrane Corp., 17th St., Philadelphia 32.

Controllers, Pneumatic

Automatic Temperature Control Co., Inc., 21 E. Logan St., Philadelphia 44.

Brown Instrument Co. Div. of Minneapolis-Honeywell Regulator Co., 4483 Wayne Ave., Philadelphia 44.

LEEDS & NORTHRUP CO., 4956 Stanton Ave., Philadelphia 44.

Minneapolis-Honeywell Regulator Co., 2730 4th Ave. So., Minneapolis 8.

Portable Products Corp., C. J. Tagliabue Div., 590 Park Ave., Brooklyn.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh.

Converters, Rotary, ac-dc

American Type Founders Sales Corp., Elizabeth, N. J.

Century Electric Co., 1811 Pine St., St. Louis.

Diehl Mfg. Co., Findern Ave, Somerville, N. J.

Electric Specialty Co., 200 South St., Stamford, Conn.

GENERAL ELECTRIC CO., Schenectady 3.

Janette Mfg. Co., 556 W. Monroe St., Chicago 6.

Leland Electric Co., Dayton.

Converters, Steel, Bessemer

BETHLEHEM STEEL CO., Bethlehem, Pa.

Pennsylvania Engineering Works, Wheeler Station, New Castle, Pa.

Pollock, William B., Co., Andrews Ave., Youngstown.

WHITING CORP., Harvey, Ill.

Conveyer Belts

Alvey Conveyor, 3201 S. Broadway, St. Louis 18.

Badger Malleable & Mfg. Co., So. Milwaukee, Wis.

Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.

Cincinnati Rubber Mfg. Co., Cincinnati.

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.

Goodyear Tire & Rubber Co., Akron 16, Ohio.

Imperial Belting Co., 1750 S. Kilbourn Ave., Chicago 23.

JEFFERY MFG. CO., 925 N. 4th St., Columbus 16, Ohio.

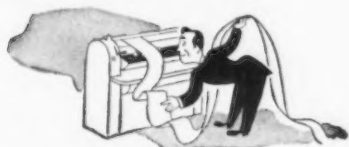
Joy Mfg. Co., Sullivan Div., Michigan City, Ind.

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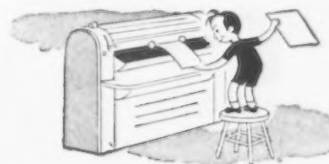
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Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40.
Shields Rubber Co., 137 Water St., Pittsburgh 22.
Smith Power Transmission Co., 1545 E. 23rd St., Cleveland 14.
WICKWIRE SPENCER STEEL DIV., COLORADO FUEL & IRON CORP., 500 5th Ave., New York 18.

Conveyers

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Associated Industrial Engineers, Inc., 1500 Race St., Philadelphia 2.
Bartlett & Snow, C. O., Co., 6200 Harvard Ave., Cleveland 6.
Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5.
BUSCHMAN, E. W., CO., INC., 4407 Clifton Ave., Cincinnati 32.
Chain Belt Co., 1755 W. Bruce St., Milwaukee 4.
CONTINENTAL FOUNDRY & MACHINE CO., Grant Bldg., Pittsburgh.
Farrell-Cheek Steel Co., Sandusky, Ohio.
Hewitt Rubber Div., Hewitt Robins, Inc., 246 Kensington St., Buffalo 5.
Hyster Company, Portland 8, Ore.
International Conveyor & Washer Corp., 652 E. Fort St., Detroit 26.
JEFFREY MFG. CO., 925 N. 4th St., Columbus 16, Ohio.
Joy Manufacturing Co., Sullivan Div., Michigan City, Ind.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40.
LOGAN CO., INC., 545 Cabel St., Louisville 6.
Material Movement Industries, 310 S. Michigan Ave., Chicago 4.
Olson, Samuel, & Co., 2418 Bloomingdale Ave., Chicago 47. *
Palmer-Bee Co., Westminster Ave., Detroit 12.
Rack Engineering Co., 5102 Butler St., Pittsburgh 1.
ROBINS CONVEYORS, INC., HEWITT ROBINS, INC., 270 Passaic Ave., Passaic, N. J.
Smidh, F. L., & Co., 11 W. 42nd St., New York 18.
Smith Power Transmission Co., 1545 E. 23rd St., Cleveland 14.
Standard Conveyor Co., 315 Second Ave. N.W., North St. Paul 9, Minn.
U. S. RUBBER CO., 1230 Avenue of the Americas, New York 20.
Walz & Krenzer, Inc., 250 Mt. Hope Ave., Rochester 7, N. Y.
Webb, Jervis B., Co., 8951 Alpine Ave., Detroit 4.

Conveyers, Chain

Badger Malleable & Mfg. Co., So. Milwaukee, Wis.
Baldwin-Duckworth Div., Chain Belt Co., Plainfield St., Springfield, Mass.
DIAMOND MFG. COMPANY, Box 28, Wyoming, Pa.
JEFFREY MFG. CO., 925 N. 4th St., Columbus 16, Ohio.
Lamson Corp., Syracuse, N. Y.
Link-Belt Co., 300 W. Pershing Rd., Chicago.
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Portable Machinery Div., Farquhar, A. B., Co., York, Pa.

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THE IRON AGE, February 19, 1948—131

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Webster Mfg. Co., Davis St., Tiffin, Ohio.

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Eastern Corp., Graybar Bldg., New York.
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Louden Machinery Co., Broadway, Fairfield, Iowa.
McCrosky Tool Corp., Meadville, Pa.
Mechanical Handling Systems, Inc., 4410 Nancy Ave., Detroit.
ROBINS CONVEYORS, INC., HEWITT-ROBINS, INC., 270 Passaic Ave., Passaic, N. J.
Starline, Inc., Bell St., Harvard, Ill.

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Alvey-Ferguson Co., Inc., Disney St., Cincinnati.
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Palmer-Bee Co., 1758 Poland Ave., Detroit.

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Alvey-Ferguson Co., Inc., Disney St., Cincinnati.
International Conveyor & Washer Corp., 650 Fort St., Detroit.
Lamson Corporation, Syracuse 1, N. Y.
Lyon Metal Products, Inc., Montgomery St., Aurora, Ill.
Meyer, Geo. J., Mfg. Co., Cudahy, Wis.
Olson, Samuel, Mfg. Co., Inc., Bloomingdale Rd., Chicago.
Otis Elevator Co., 260 11th Ave., New York 1.

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Hyster Co., 2900 Clackamas St., Portland, Ore.
Lamson Corporation, Syracuse 1, N. Y.
Link-Belt Co., 301 W. Pershing Rd., Chicago.
Mathews Conveyor Co., 10th St., Ellwood City, Pa.
Palmer-Bee Co., Poland Ave., Detroit.

Conveyers, Tray

JEFFREY MFG. CO., 925-99 N. 4th St., Columbus 16, Ohio.
Lamson Corporation, Syracuse 1, N. Y.
Link-Belt Co., 301 W. Pershing Rd., Chicago.
Read Machinery Co., Inc., Richland Ave., York, Pa.
Webb, Jervis B. Co., Alpine Ave., Detroit.

Coolers, Cast Iron

Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.
KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19.
Lamson Corp., Syracuse 1, N. Y.
Youngstown Foundry & Machine Co., P. O. Box 539, Youngstown 1.

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Coolers, Oil (See Oil Coolers)

Coolers, Sample

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32.

Industrial Instruments, Inc., 165 Culver Ave., Jersey City, N. J.

Coolers, Wall, Burner, Etc., for Steel Mill

Blaw-Knox Company, 2040 Farmers Bank Bldg., Pittsburgh.

WHITING CORP., 15623 Lathrop Ave., Harvey, Ill.

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Beam-Knodel Co., 195 Lafayette St., New York 12.

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The Puritan Manufacturing Co., Waterbury, Conn.

Sommers Bros. Manufacturing Co., 3439-41-43 N. Broadway, St. Louis 7.

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Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47.

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Borne, Scrymser Co., 635 Front St., Elizabeth, N. J.

Certified Core Oil Div. of Socony-Vacuum Oil Co., Inc., 3308-26 S. Cicero Ave., Cicero 50, Ill.

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National Oil Products Co., Harrison, N. J.

Obermayer Co., S., 2565 W. 18th St., Chicago.

Sinclair Refining Co., 630 5th Ave., New York.

Smith, Werner G., Co., 2195 110th St., Cleveland.

Stevens, Frederick B., 510 3rd Ave., Detroit.

Core Washes & Foundry Materials

Foundry Rubber, Inc., 1050 30th St., N.W., Washington 7, D. C.

UNITED OIL MANUFACTURING CO., 1429 Walnut St., Erie, Pa.

Corrosion Resistant Alloys

Alloy Casting Co., Victor Ave., Champaign, Ill.

AMERICAN BRASS CO., New York, N. Y.

AMERICAN ROLLING MILL CO., 366 Curtis St., Middletown, Ohio.

AMERICAN STEEL & WIRE CO., Rockefeller Bldg., Cleveland 13.

AMPCO METAL, INC., 1745 S. 38th St., Dept. 1A-1, Milwaukee.

Aurora Metal Co., 614 West Park Ave., Aurora, Ill.

BETHLEHEM STEEL CO., Bethlehem, Pa.

Blaw-Knox Co., Pittsburgh.

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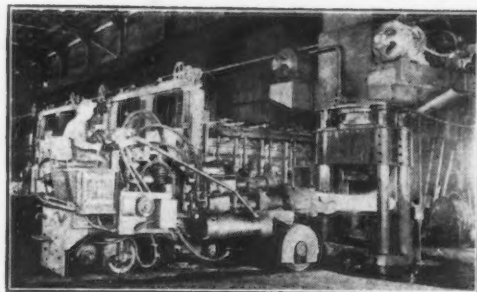
Baskets and crates are furnished in a wide variety of designs. Basket in upper picture is heavy duty type for handling parts through degreasing. Lower picture shows large alloy basket for pusher type conveyor furnace.

Send for new catalog 16 which describes Stanwood baskets, trays, fixtures, retorts and carburizing boxes.



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- CARPENTER STEEL CO., 321 W. Bern St., Reading, Pa.
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- Columbia Steel Co., Russ Bldg., San Francisco 6.
- Commerce Pattern Foundry & Machine Co., 7450 Melville at Green, Detroit 17.
- Driver-Harris Co., P. O. Drawer No. 31, Harrison, N. J.
- Empire Steel Castings, Inc., Box 139, Reading, Pa.
- HAYNES STELLITE CO., DIV. UNION CARBIDE & CARBON CORP., 30 E. 42nd St., New York 17.
- HOSKINS MANUFACTURING CO., 4445 Lawton Ave., Detroit 8.
- INLAND STEEL CO., 38 S. Dearborn St., Chicago 3.
- INTERNATIONAL NICKEL CO., INC., 67 Wall St., New York 5.
- LEBANON STEEL FOUNDRY, Lebanon, Pa.
- Metal Hydrides, Inc., 16 Congress St., Beverly, Mass.
- Metallizing Engineering Co., 38-14 30th St., Long Island City 1, N. Y.
- Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.
- Niagara Falls Smelting & Refining Div., Continental-United Industrial Co., Inc., 2208 Elmwood Ave., Buffalo 17.
- OHIO STEEL FOUNDRY CO., Lima, Ohio.
- PETER A. FRASSE & CO., INC., Frederick, Md.
- PITTSBURGH STEEL FOUNDRY CORP., Glassport, Pa.
- REVERE COPPER AND BRASS INC., 230 Park Ave., New York 17.
- REYNOLDS METALS CO., Aluminum Div., Louisville.
- Ross-Meehan Foundries, P. O. Box 1258, Chattanooga, Tenn.
- RUSTLESS IRON & STEEL DIV., THE AMERICAN ROLLING MILL CO., 3400 E. Chase St., Baltimore 13.
- Siryer Steel Castings Co., 1675 S. 43rd St., Milwaukee 14.
- Sommers Bros. Mfg. Co., 3439-41-43 N. Broadway, St. Louis 7.
- Sterling Alloys, Inc., Woburn, Mass.
- United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.
- Wall-Colmonoy Corp., 714 Fisher Bldg., Detroit 2.

Corrosion-Resisting Paint (See Paint, Corrosion Resisting)

Corrugating Machines, Sheet Metal

- KANE & ROACH, INC., Syracuse, N. Y.
- BLISS, E. W., CO., Amsterdam Ave., Detroit 2.
- FARQUHAR, A. B., & CO., 1503 N. Duke St., York, Pa.
- FERRACUTE MACHINE CO., Bridgeton, Conn.
- NIAGARA MACHINE & TOOL WORKS, Northland Ave., Buffalo 11.
- Peck, Stow & Wilcox Co., Mill St., Southington, Conn.

Counterbores

- Acme Tool Co., 96 Warren St., New York 7.
- Brubaker & Bros. Co., W. L., Railroad St., Millersburg, Pa.
- CHICAGO LATHROBE TWIST DRILL WORKS, 411 W. Ontario St., Chicago 10.
- CLEVELAND TWIST DRILL CO., 1246 E. 49th St., Cleveland 14.

(TO BE CONTINUED)

Denies Britain Cut Shipbuilding Steel To Please America

London

... It has been suggested here that the allocation of steel to the shipbuilding industry has been cut in deference to American views. This is denied by Douglas Jay, economic secretary to the Treasury. The idea that there is any connection between the decision on steel allocation and the views expressed by the U. S. authorities about European shipbuilding and Marshall aid is entirely false, he says. The decisions on steel allocation were taken many weeks ago, some time before the views of the U. S. administration had been made known.

The present allocation for shipbuilding, according to Mr. Jay, is actually higher than the allocation for 1947. Complaints by shipbuilders stem from the fact that deliveries of steel during 1947 were well above the planned allocation. The industry got more than according to the general plan it should have got and, therefore, the present allocation, though rather higher than last year's, will be somewhat less than last year's supply. The official view is that more ships are likely to be delivered this year than last. Shipbuilders are reported to have as much as 3 years work in hand.

January Construction Well Above Last Year

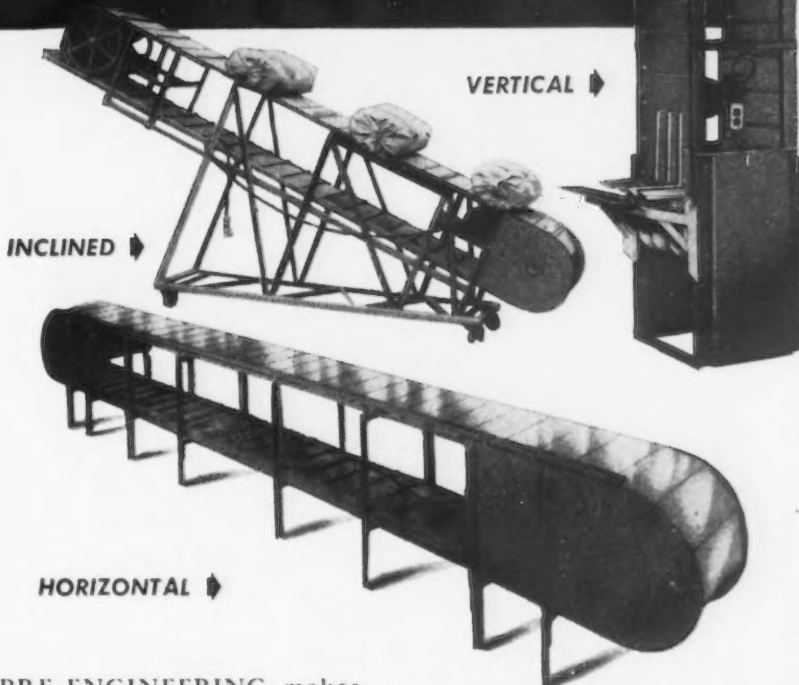
Washington

... Despite the normal seasonal downtrend, revised BLS statistics place January construction at \$1,261 million, a third higher than for the same month 1947, including \$150 million for repair and maintenance.


Private construction totalled \$899 million, of which \$510 went into new housing units; construction for commercial and industrial purposes approximated \$220 million.

Total public construction expenditures amounted to \$207 million. Effect of the cold weather in both December and January has reduced highway construction from \$110 million to around \$50 million.

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Please send me complete information including engineering data and specifications on your Steel Belt Conveyors.

Please have your representative call to discuss our specific materials handling problems.

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CITY _____ STATE _____

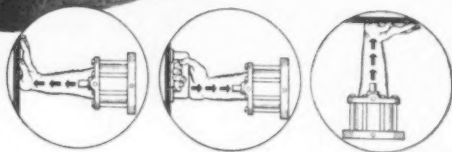
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NEWS OF INDUSTRY

12 New Facilities Included in \$500 Million Expansion

New York

... United States Steel Corp. hit the public relations jackpot recently with its announcement of 12 new major facilities now under construction, nine of which are slated to begin operations this year. This announcement should go far toward stilling the clamor for capacity expansion which has been voiced with emphasis varying from the plaintive to the acrid by consumers, Congress and general public.

Listing the 12 new facilities point by point is an expansion argument which can hardly be ignored—even by those who claim that the steel industry is not expanding capacity as rapidly as it should. Thus the corporation has scored again in the cold war of public relations.

The U. S. Quarterly described the new facilities as "the principal elements in United States Steel's \$500 million development program." The following approximate dates have been set for the completion of the 12 major projects:

(1) Increase in the cold rolled strip and tin plate productive capacity at the Irvin Works of Carnegie-Illinois, Pittsburgh district—fourth quarter 1948.

(2) Increase in the cold rolled strip and tin plate productive capacity at Gary Works of Carnegie-Illinois, Chicago district—fourth quarter 1948.

(3) Conversion of a hot rolled mill to a cold reduction mill at Fairfield Works of Tennessee Coal, Iron and Railroad Co. in the Birmingham district—fourth quarter 1948.

(4) New research laboratory at Duluth and Trout Lake pilot plants at Coleraine, Minn., Oliver Iron Mining Co. to improve and beneficiate the lower grade ores of the Mesabi Range—second quarter 1948.

(5) New cold rolled strip mill at Pittsburg, Calif., by Columbia Steel Co., now nearing completion—second quarter 1948.

(6) New cold rolled strip mill at Los Angeles, Calif., by Columbia Steel Co.—fourth quarter 1949.

(7) Construction program of National Tube Co. at Lorain, O., and additional tube making facilities at Gary, Ind.—first quarter 1949.

(8) Remodeling of the 132-in. plate mill of Geneva Steel Co., Utah, for the manufacture of hot strip coils to supply West Coast mills—first quarter 1949.

(9) New coal washers at Robena Mine, H. C. Frick Coke Co., and Gary, United States Coal and Coke Co.—third quarter 1948.

(10) New coke oven battery at Clairton, Pa., works of Carnegie-Illinois Steel Corp.—fourth quarter 1948.

(11) Increased production of silicon steel at Vandergrift, Pa., works of Carnegie-Illinois Steel Corp.—second quarter 1948.

(12) Two new blast furnaces at South Works, Carnegie-Illinois, Chicago—second quarter 1948.

The above 12 facilities are indicative of the trend toward further integration within the corporation. A breakdown of the 12 facilities shows that 7 are for steel finishing, 2 are for coal and coke supplies, 2 are for steelmaking and 1 is for beneficiation of lower grade ores.

Recommend Restriction Of British Car Owners

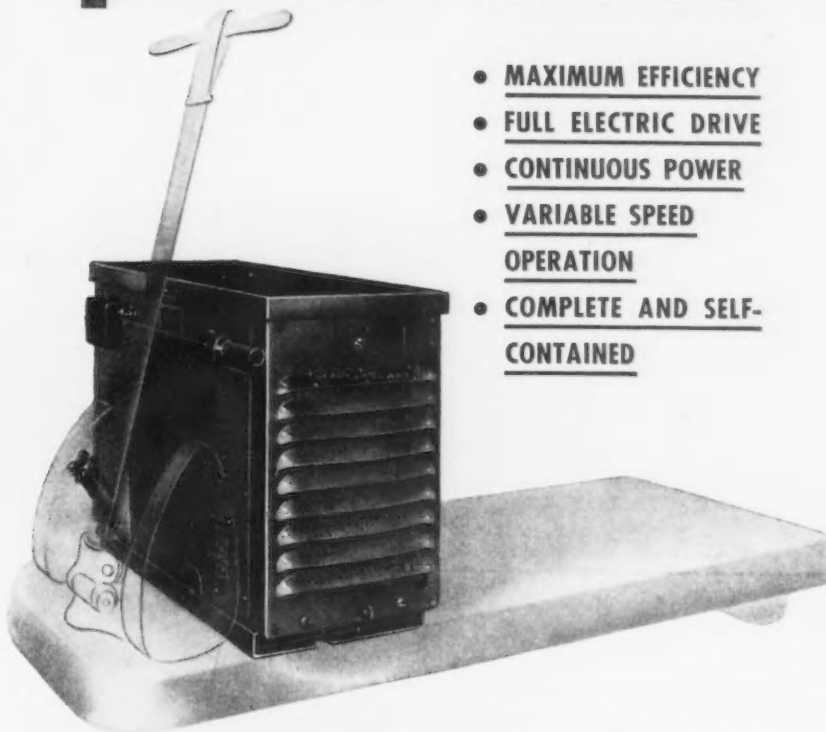
London

••• At the request of the Ministry of Supply, the British Society of Motor Manufacturers and Traders have recommended to their members that the delivery of new cars should be restricted generally to holders of gasoline coupons.

Although the action is in line with the government's view that the abolition of the basic gasoline ration would make it possible to judge the size of the essential home market for new cars, it raises important questions of policy which affect the large number of private motorists who have new cars on order. It means, for example, that new cars are henceforth mostly reserved for those who already own and run cars, because petrol coupons are supplied only to people who have licensed cars. Motorists who have not been granted petrol presumably will be prevented from taking delivery of new cars and storing them.

MOTORIZED HAND-LIFT TRUCKS ARE BETTER WITH READY-POWER

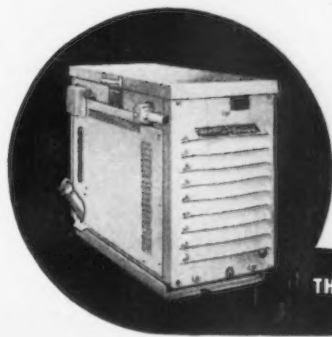
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- CONTINUOUS POWER
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Ready-Power-equipped Motorized Hand-Lift Truck "incbing" a load into a box car.



THE **READY-POWER** CO.

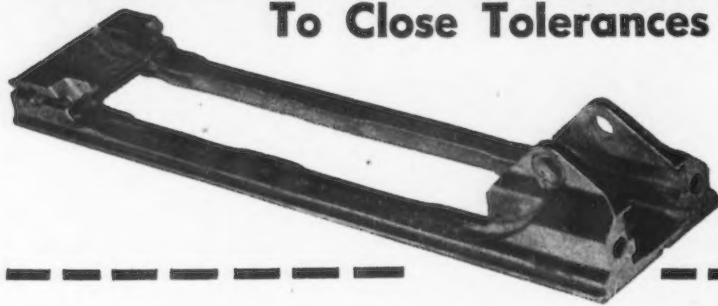
3822 Grand River Ave., Detroit 8, Michigan

Ready-Power has been preferred power for electric industrial trucks for over two decades. The superior performance, long life and dependability of Ready-Power has earned the high regard of practical material movers.

Now, after long, careful development, Ready-Power is available for Motorized Hand Lift Trucks. In Ready-Power Model "Z" Units, specially developed for this service, all the desirable features of Ready-Power become available for the users of these small, hard working material handlers.

Bulletin No. 114 describing Model "Z" Units will be mailed to you on request.

PRECISION PRODUCTS To Close Tolerances



AS a result of its wartime activities in manufacturing gunparts, which brought the Army-Navy Award with three stars, the Hendrick plant now has surplus facilities available for making small to medium size precision products to close tolerances.

In fact, it is a common procedure for Hendrick's experienced machine tool operators to work to a tolerance of .0005 inches.

If you will submit specifications and samples of products on which you wish quantity prices, we will quote promptly.



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Perforated Metal Screens
Architectural Grilles
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used for Tough Jobs... THERE
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There is a type and construction to fit every wire rope requirement, whether Round Strand or Flattened Strand—Preformed or Non-preformed.

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NEWS OF INDUSTRY

Urges America Loan Industrial "Brains" To Western Europe

Chicago

••• A plan to volunteer the services of American industry's top executives and technical experts to western European nations for the purpose of improving their manufacturing methods and processes and stepping up production abroad is being advocated by Roy W. Gifford, chairman of the board of Borg-Warner International Corp. Mr. Gifford is urging this country's manufacturers to unite in an Industrial Council for European Aid.

Under Mr. Gifford's plan, industrial executives, as well as engineers, production experts, technical specialists and departmental foremen, would be temporarily loaned to European companies requesting such help.

"Cash loans and food and raw materials by themselves will not enable western Europe to throw away her crutches and walk alone," Mr. Gifford declared. "Europe's large industrial machine must be overhauled and rebuilt if her economy is to be strengthened. It should be the aim and to the advantage of both lender and borrower to keep the actual outlay for European aid at the lowest possible figure," Mr. Gifford continued. "The program which I suggest would take the form of an offer made by organized American industry to organized European industry. The results thus obtained would be greater and the expense far less, and the American taxpayer would be relieved more quickly of the burden of aiding Europe."

Portsmouth Net Earnings

Portsmouth, Ohio

••• Net earnings of Portsmouth Steel Corp., for the year ended Dec. 31, 1947, totaled \$3,944,969, after all charges and taxes, including \$805,024 for depreciation and \$2,358,000 for federal income taxes.

This is equal to \$3.03 each on the 1,301,550 shares of common stock. Dividends of 75¢ per share were paid by Portsmouth Steel during 1947. Net sales for the year were \$49,459,952.

Lustron Corp. Buying \$5 Million Machinery For Plant Expansion

Columbus, Ohio

••• During the past 2 months, Lustron Corp. has placed orders for plant equipment totaling \$5,455,433, according to Carl G. Strandlund, president. "Ten pct of the machinery has been delivered," he said.

Danly Machine Specialties Co., Chicago, received orders worth \$640,077 which includes a 1800 ton press. Albert J. Boland Co., St. Louis, Mo., will supply large, special furnaces worth \$425,200. Spray-Con Co., Chicago is furnishing the biggest cleaning, spraying and baking system used by any enameling company and worth \$279,364.

Other firms receiving new orders include: Carlin Tool and Die Co., Detroit, Mich., \$91,013; Mardigan Corp., Detroit, \$60,660; Specialty Equipment Co., New York City, \$800; Wille Tool Corp., Chicago, \$9,140; Chicago Vitreous Enamel Products Corp., Chicago, \$2,320; DeVilbiss Co., Toledo, Ohio, \$161,082; Metalwash Machinery Co., Irvington, N. J., \$243,278; Dispatch Oven Co., Minneapolis, Minn., \$68,696; Conveyor Systems, Chicago, \$52,280.

Rolling equipment totaling \$60,929 will come from Seifreut-Elstad Co., Dayton, Ohio, \$43,021; American Surplus Machinery Co., Detroit, \$6,600; Industrial Tool Engineering Co., Detroit, \$11,308. The Federal Welder and Machine Co., Warren, Ohio, has orders for \$95,766.


Strandlund said Lustron will produce 17,500 homes in 1948. "Next year's production will soar above 40,000 Lustron Homes," he said.

Koppers Sales Increase

Pittsburgh

••• Total revenue received by Koppers Co., Inc., during 1947 from sales, investments, etc., was \$162,931,072 compared with \$112,651,379 in 1946, the company's annual report to stockholders reveals.

Net income for 1947 was \$6,165,783 which, after payment of preferred dividends, is equivalent to \$4.94 per share of common stock outstanding at the year end. This compares with a 1946 net income of \$3,206,475, or \$2.79 per share on the shares of common stock then outstanding.



**CUT
HIGH COST
SET-UP TIME
with
NORTHERN
ELECTRIC HOISTS**

Give that expensive machine tool a real chance to do its stuff—to show more machine time—less set-up time. Load and unload it quickly and safely with a NORTHERN ELECTRIC HOIST.

• WRITE FOR BULLETIN NO. 106-H •

OVERHEAD ELECTRIC CRANES AND HOISTS	★ ★ ★	NORTHERN ENGINEERING WORKS
		2615 Atwater St., Detroit 7, Mich.

THE PROBLEM:

214 PLATES TO BE PUNCHED,
each having 32 holes 13/16" dia., 4 holes
1-1/16" dia. and 2 notched corners 2" square.

THE ANSWER

If runs are short, spacing of
holes irregular, sizes and
shapes of holes varied . . .
Then the Thomas Plate Du-
plicator is the answer to
your production problems.

BULLETIN 312

contains a complete descrip-
tion of this indispensable
machine. Write.

PUNCHES • SHEARS • PRESSES
BENDERS • SPACING TABLES

**THOMAS
PLATE DUPLICATOR**

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, 23, PA.

18

**FREE
SAMPLES****FLEXLOC****SELF-LOCKING NUTS**

Pat'd &
Pats. Pend.

The one-piece, all-metal "Flexloc" packs maximum usefulness in minimum space by combining, as it does, a stop, a lock and a plain nut all in one.

Every thread—including the locking threads—takes its share of the load. "Flexloc" accommodates itself to a wide range of thread tolerances . . . can be used over and over again without losing much of its locking torque . . . is not affected by temperatures likely to be met within the field of Mechanical Engineering . . . and being a "stop" nut, it stays locked in any position on the threaded member. The "Flexloc" is processed to have an exceptionally uniform torque.

The Thin "Flexloc" has become very popular because its tensile is so high and the space it occupies so small.

Sizes from #6 to 2" in diameter—in "regular" and "thin" types—in NC and NF thread series. Write for "Flexloc" Catalog.

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA., BOX 100 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

Weekly Gallup Polls

(CONTINUED FROM PAGE 121)

both cases are: "Send smaller amounts;" "yes, if necessary;" "yes, if it won't hurt our economy."

Business and professional voters interviewed are less strongly opposed to American-Soviet private trade than manual workers, which is in odd contrast to Russian epithets about U. S. capitalists. The following table shows the vote by occupation groups on the question of trade with Russia by private American firms.

Occupation

	Stop Pct	Con- tinue Pct	No op. Pct	Qual- ified Pct
Prof. & Bus.	69	21	5	5
Farmers	76	9	13	2
White-Collar workers	71	20	6	3
Manual workers	73	12	12	3

The question as to what extent American goods should be sold to the Russians has been raised several times during congressional hearings on the European Recovery Program (the Marshall Plan).

While testifying in support of ERP recently, Phillip Read, chairman of the General Electric Corp., declared that GE was sending now only general-purpose goods under old contracts. He said no new contracts are anticipated after current orders are filled.

Suggests Armco Name

Middletown, Ohio

• • • A proposal to change the name of American Rolling Mill Co. to Armco Steel Corp. will be submitted to shareholders for consideration at their annual meeting Apr. 15, 1948, according to Charles R. Hook, president.

Mr. Hook said the change in name had been under consideration for some time. "The proposed new name utilizes the company's well known trade name 'Armco,' and at the same time indicates that it is a steel company," he stated.

"The name 'Armco,' which is used as the trademark to identify all our products and all the company's activities, has been the theme of national consumer advertising since 1914 and has been emphasized in all publicity since then."

Canadian Output Up

(CONTINUED FROM PAGE 124)

steel ingots in Canada has risen by almost 60 pct since before the war; nevertheless, further facilities are being added which will have the effect of increasing production. A bessemer converter has been placed in operation at the Soo which will increase ingot production at that point and reduce consumption of steelmaking scrap. New coke ovens are being erected at Sydney with a normal capacity of 400,000 tons.

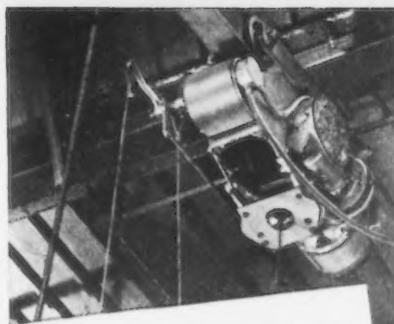
The Steel Co. of Canada has just placed in operation a new battery of coke ovens at its Hamilton works and from reliable sources it is learned that the company has plans for another battery as well as a large additional blast furnace. Dominion Foundries & Steel Ltd., also at Hamilton, has announced its intention of installing coke ovens and a blast furnace. Further important additions to a finishing plant are under way at the Steel Co. of Canada of which the most notable is the 54-in. cold strip mill now nearing completion.

When the proposed new blast furnace installations have been completed, Canada should have enough steel to feed all finishing departments including those nearing completion and planned. Up to the present time it has been necessary for Canada to import, largely from the United States, approximately 30 pct of her steel requirements. Thus, when presently planned additional production capacity is available it may be assumed that this country will be in a position to substantially reduce finished steel imports and confine these largely to lines not made in Canada.

Armco Borrows \$30 Million

Middletown, Ohio

• • • Charles R. Hook, president of The American Rolling Mill Co., reports that negotiations have been completed for the issue and sale to Equitable Life Assurance Society of \$30 million principal amount of 20-year 3 pct debentures of the company. The proceeds are proposed to be used in connection with modernization and expansion.



Modern Hoist Logic:
3-2 = LOWER COSTS!

—Yes, rock-bottom handling costs—and more output per hour! Here's the record: Heavy drums of chemicals had to be lifted to a raised vat—and lifted fast. The block and tackle formerly used required 3 men to get the proper lift speed. This 1/2-ton Reading Electric Hoist paid for itself in 2 months by keeping 2 men on their regular jobs and letting the third raise drums alone—in half the previous time! Let a Reading engineer help you get the same kind of handling results with a fast, smooth-working Reading Electric Hoist. Drop us a line today for full details. No obligation, of course.

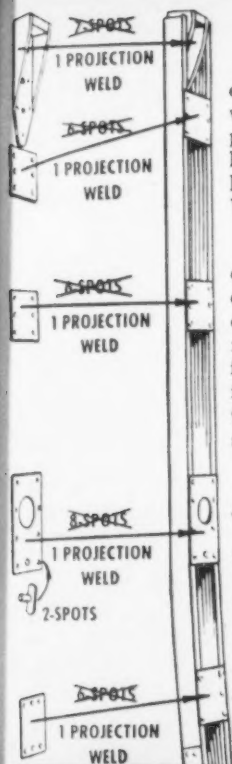
READING CHAIN & BLOCK CORP.
2101 ADAMS STREET • READING, PA.



**READING
HOISTS**

THE IRON AGE, February 19, 1948—141

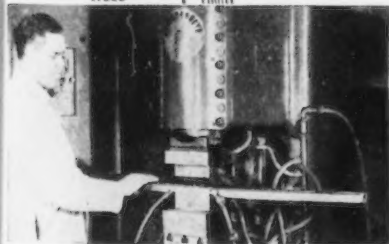
28 Operations
Eliminated
PLUS
COST—cut in half
PRODUCTION—doubled



That's not an easy job to do when the company is AL-READY USING RESISTANCE WELDING.

But . . . Progressive Welder did it . . . by recommending a minor change in five of the stampings and projection instead of spot welding.

For the complete story, plus "How one Progressive machine pays the wages of 10 operators," "Welding 14,000 turntables a day on 15-KVA," etc. . . .



..... see

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PICTORIAL #50
Ask for it, today.
IT PAYS TO WELD

PROGRESSIVE
WELDER COMPANY
3050 E. OUTER DRIVE, DETROIT 12, U.S.A.

MACHINE TOOLS

... News and Market Activities

Market Softness Expected As Result of Break in Commodity Prices

• • • Continuation of the commodity market break suggests to qualified observers that a number of developments, all more or less unpleasant, are in store for the machine tool industry during the next few months.

It is already apparent that caution will be the keynote with a majority of machine tool buyers. Field representatives and dealers have been reporting for some time that quotations were out in volume, but hard to close. It follows that many machine tool makers are going to reaffirm a fact they already know—there are plenty of machine tools in this country.

Export markets, solely because of the lack of dollars, or dollar exchange, do not appear sufficiently promising to take up the slack which seems likely to develop in the domestic market.

By and large, machine tool price trends are expected to be in the direction of softness. Conceivably, a break could come about almost over night. A number of machine tool plants are in stock condition at the present time on most of the regular models.

In Cleveland, first gun in the ASTE preshow bombardment was fired by Harry E. Conrad, ASTE executive secretary, at a press conference. Mr. Conrad said the ASTE show, March 15-19, in the Public Auditorium, Cleveland, will bring more than 50,000 key industrialists to Cleveland.

The Society's 16th national meeting will be held concurrently. This will mark the second time the ASTE has chosen Cleveland as the site of its exposition.

Tool engineers and production executives from throughout the nation and many provinces of Canada as well as representatives of foreign countries will attend this exposition to see the latest methods and devices developed to aid industrial production. It is expected that this show will surpass, both in attendance and number of exhibitors, the 1946 New Era Ex-

ASTE Exposition and Meeting Is Expected to Attract 50,000 Spectators

o o o

position, which drew more than 50,000 visitors.

Pointing out the value of the exposition as a medium through which men of industry can exchange knowledge of new tools and processes at this particular time, Mr. Conrad said, "We are faced, more than ever before, with the problem of turning out more goods at lower prices—and at the same time paying higher wages—to combat inflation.

"New devices, including developments in tools and processes brought forth since this peacetime drive for production started, will be on display. Some of these innovations have recently been introduced to this country from Europe."

Technical sessions and plant tours will form an important part of the convention program, which will feature James D. Mooney, president and chairman of the board, Willys-Overland Motors, as guest speaker at the annual banquet to be held in the ballroom of Hotel Carter, Thursday evening, March 18.

The technical sessions will be devoted to subjects designed to aid in increasing production and will consist of discussions of important phases of production problems by recognized leaders in the various fields.

Tours of plants in the Cleveland area have been arranged so that tool engineers and other exposition visitors will have an opportunity to observe a wide variety of industrial operations.

Plants which will be opened to exposition visitors are: Warner & Swasey Co., Ohio Crankshaft Co., White Motor Co., Fisher Body

Div. General Motors Corp., National Acme Co., General Electric Co. (Nela Park), Weatherhead Co., Reliance Electric & Engineering Co., Republic Steel Corp. (strip mill), Jack & Heinz Precision Industries, Inc., and Laboratories of National Advisory Committee for Aeronautics.

In Detroit there is little change in the machine tool market compared with a week ago. Suppliers of standard and semi-special machines continue to report an active market for many of their products. Many of Detroit's tool and die shops are reported to be working under considerable pressure to complete the die program for the new Ford.

Meanwhile, builders of welding equipment indicate a quiet market for their equipment at present, although backlogs are still substantial. Sizable amount of Chrysler die work is in Detroit shops at present and it has been confirmed that a die program for Tucker has been awarded to a prominent Detroit die shop.

Most active tooling programs here at present time are Chrysler-Dodge, Kaiser-Frazer and Ford and Reo. There are recent indications that the proposed Reo program may become final within the next 60 days.

Named to Atomic Post

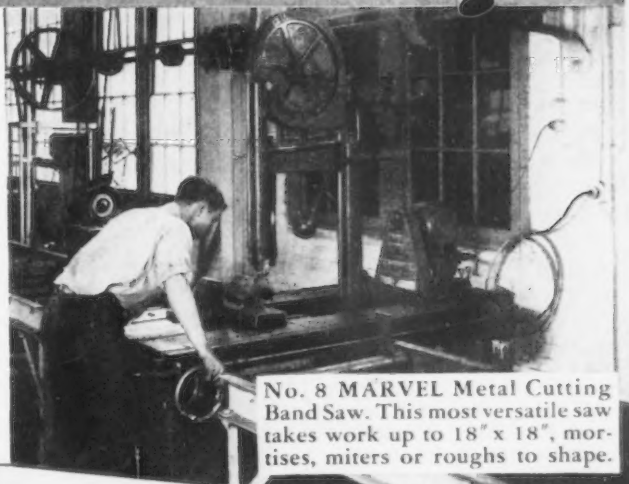
Pittsburgh

• • • Dr. Robert F. Mehl, director of the metals research laboratory and head of the department of metallurgical engineering at Carnegie Institute of Technology, has been appointed to the Committee for the Distribution of Radioisotopes, according to an announcement from the Atomic Energy Commission in Washington. Dr. Mehl, in serving on the committee, will be concerned with the distribution of isotopes for metallurgical research and industrial application.

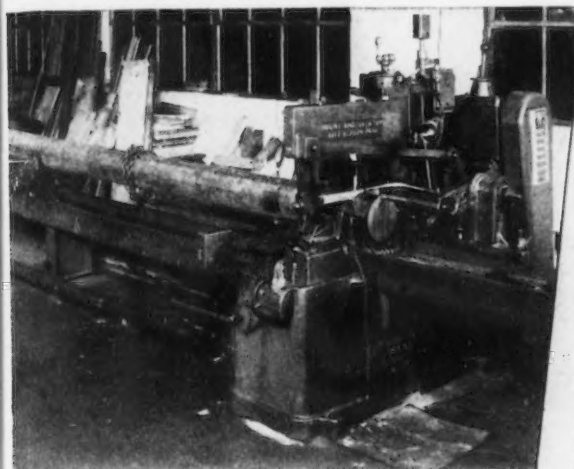
WHICH IS BETTER FOR YOU, HACK SAWS OR BAND SAWS?

Reading Chain & Block Corporation found the answer by contacting the MARVEL field engineer. Only a MARVEL engineer could analyze this problem without bias because only MARVEL makes both hack saws and band saws. As a result, Reading bought three different types to most efficiently handle their metal sawing. A No. 6A machine for production cutting of identical pieces, a No. 4B machine for fast, accurate, miscellaneous cutting, and a No. 8 band saw machine for cutting of structurals, mitering, and other miscellaneous work.

Whatever your metal sawing problem, there is among MARVEL'S 11 different series of sawing machines, a saw or saws that will exactly meet your needs. Your local MARVEL Engineer will gladly study your sawing problems, make recommendations and quote prices.



No. 8 MARVEL Metal Cutting Band Saw. This most versatile saw takes work up to 18" x 18", mortises, miters or roughs to shape.



No. 6A MARVEL Production Saw (world's fastest) automatically feeds, measures and cuts off identical pieces from nested or single bars up to 6" x 6" cross section.



No. 4B MARVEL High Speed Saw is a moderate priced, very fast 6" x 6" capacity saw. Here it ideally meets the requirements of the maintenance department.

READING CHAIN and BLOCK CORPORATION

TELEPHONE 4888

Materials Handling Equipment
CHAIN HOISTS - ELECTRIC HOISTS - TRAVELING CRANES - MONORAIL SYSTEMS
GENERAL OFFICE
READING, PA. U.S.A.

October 24, 1947

Armstrong-Blum Mfg. Company
5700 West Bloomingdale Avenue
Chicago, 39, Illinois

Gentlemen:

We have in our shop three Marvel Saws which are used all day in production work for the cutting of materials in connection with the manufacture of hoists and cranes. Since these three saws have been used in our plant the cost of cutting materials has been greatly reduced, and the speed at which the materials are cut has been increased to such a point that we no longer have "lay overs" due to the lack of materials.

We wish to assure you at this time that when we need more automatic saws in our plant, we will definitely give you first consideration to install the Marvel Saws in our plant.

Whenever it has been necessary for any repair service, or engineering service, to be applied to these saws, we have never had to wait or inquire the second time for these services. That is one thing that has kept us in production to this date.

Again assuring you that your services and attentions to our requirements have been very satisfactory, we remain,

Very truly yours,

READING CHAIN & BLOCK CORP.

Fred M. Howard

Fred M. Howard
Purchasing Agent

F. H. H. H.



ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave.

Chicago 39, U. S. A

NONFERROUS METALS

... News and Market Activities

Copper

••• There was no evidence of weakness in consumer demand for copper last week despite the decline in the commodity market. Pressure on producers is reported to have grown even stronger for March delivery than it was for January and February. Brass mill requirements have increased in March and there are no signs of a let-up in wire mill demand. Some users of refinery shapes have agreed to take cathode copper due to the shortage of shape tonnage. Electrolytic consumers are now taking fire refined copper in some cases. Chilean producers report they are bringing into the country as much copper as they can. Yet producers must allot available tonnages to consumers. There are reports in the trade of above market deliveries of small tonnages to domestic consumers.

Foreign demand strengthened last week. Major producers are still selling for export at 21.50¢ and report sales in larger volume at this price. Producers who have looked into the export licensing procedure after Mar. 1 find that there will be no additional barrier to the export of foreign copper refined in the United States. Commerce Dept. officials say they will be in a position to process and return export applications in 24 hours.

Copper Scrap Prices Drop

New York

••• Ingot makers are still out of the scrap market and what little buying of copper and brass grades there is has been done at prices from $\frac{3}{4}$ ¢ to $1\frac{1}{4}$ ¢ below the former market. Refinery prices have been reduced by $\frac{1}{2}$ ¢ on copper items and $\frac{1}{4}$ ¢ on brass. Dealers' buying

prices on No. 1 and No. 2 copper were reduced last week by $\frac{1}{2}$ ¢ a lb as the result of the lower refinery prices. Other metals remained unchanged.

Aluminum

••• Demand for aluminum in all forms is reported to be continuing at a high level. One producer requires all orders for sheet, extrusions and wire, rod and bar to be submitted to the home office for self-allocation and scheduling. Delivery time on all these products runs from three to four months.

Lead

••• Consuming pressure for delivery of lead is reported to have eased off somewhat as consumers are studying their inventory position in the light of the possibility that the metal may have reached its price peak. In addition, the requirements of the battery makers have declined due to seasonal factors in the auto industry. Nevertheless, there is no surplus metal available for those who are not established consumers.

Zinc

••• Requirements for all grades of zinc are high, although producers report that the last week has seen some easing in the pressure from consumers. Whether this is an aftermath of the commodity price drop or the natural result of the recent increase in the price of the metal is hard for producers to determine. The decline in demand is not such as to indicate the prospect of any competitive pressure to sell, with accompanying price decline.

High Order Level For Brass Mill Products

New York

••• There is no evidence yet of a decline in the demand for brass mill products following the slump in commodity prices, according to brass mill officials. The present mill backlogs for most products are estimated at 6 weeks with present two full and a partial third shift production. Brass rod backlogs are reported to average 2 weeks. The brass mill order volume is still below normal as the result of the large volume of orders placed between the increase in the zinc price and the adjustment of mill prices. Mill executives expect there will be no major disruption of order volume for some time to come. They point to the reduction of consumer inventories which began early last summer and continued well into October. Expanded plant capacity in the industry, an outgrowth of the war, is expected to be greater than needed for normal market requirements. The present rate of demand, however, is such as to require all available plant facilities.

Lead, Zinc Output Drops

Ottawa

••• Canada's production of lead and zinc last year fell below the record of 1946. For 1947, production of lead totalled 159,000 tons, compared with 177,000 tons in 1946. Output of zinc at 214,000 tons fell from 235,000 tons in the year immediately preceding.

Production of lead in December amounted to 10,900 tons against 14,700 tons in November. Zinc output rose to 19,400 tons in December from 18,700 tons in November.

Tin

••• World Production of tin in ore in 1947 is estimated by the International Tin Study Group at 113,000 tons compared with world consumption of 131,600 tons, the difference representing the reduction of world stocks and the consumption of stocks of tin found in the East since the end of the war.

Nonferrous Metals Prices

Cents per pound

	Feb. 11	Feb. 12	Feb. 13	Feb. 14	Feb. 16	Feb. 17
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York.	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis.	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis.	14.80	14.80	14.80	14.80	14.80	14.80

NONFERROUS METALS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be	
dollars per lb contained Be	\$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$40.00
Cadmium, del'd	\$1.75
Cobalt, 97-99% (per lb)	\$1.65 to \$1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$80 to \$90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$77 to \$79
Nickel, electro, f.o.b. New York	36.56¢
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$69 to \$72
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	94.00
Zinc, East St. Louis	12.00
Zinc, New York	12.61
Zirconium copper, 6 pct Zr, per lb contained Zr	\$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5 ingot	
No. 115	19.00-19.25
No. 120	18.50-18.75
No. 123	18.00-18.25
80-10-10 ingot	
No. 305	24.25
No. 315	21.75
88-10-2 ingot	
No. 210	30.00
No. 215	28.00
No. 245	21.75-22.75
Yellow ingot	
No. 405	15.00-16.00
Manganese Bronze	
No. 421	18.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	17.50-17.75
0.60 copper, max.	17.25-17.50
Piston alloys (No. 122 type)	16.50-16.75
No. 12 alum. (No. 2 grade)	16.25-16.75
108 alloy	16.25-16.50
195 alloy	16.50-16.75
AXS-679	16.50-17.00
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1-95 pct-95½ pct	16.50-17.00
Grade 2-92 pct-95 pct	16.00-16.50
Grade 3-90 pct-92 pct	15.50-16.00
Grade 4-85 pct-90 pct	15.25-15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37½
Electrodeposited	32½
Rolled, oval, straight, delivered	33.09
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	33½
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz lots per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulfate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt. allowed	14.50
Silver cyanide, 100 oz lots, per oz.	54.00
Sodium cyanide, 96 pct domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.	
Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.	
Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.	

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. Rod: 2S, 3S, 1¼ to 2¼ in. diam rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. Round Wire: drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢, 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSA, ¼ in., 54¢-56¢; 0.188 in. 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01¢; 22, 1.12¢-1.31¢; 24, 1.62¢-1.75¢. Specification grade higher.

Round Rod: M, diam. in. ¼ to ¾, 47¢; ½ to ¾, 45¢; 1¼ to 2¼, 43.5¢; 3¼ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in. ¼ to ¾, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2¼, 45¢; 3¼ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.067, ¼ to 5/16, \$1.21; 5/16 to ¾, \$1.12; ¾ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ¾, 89¢; ½ to ¾, 81¢; 0.065 to 0.082, ¾ to 1, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	41	
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks		31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, lcl.	16.50-17.00
Ribbon	15.25-16.00
Plates	
Small	14.25
Large, over 12 in.	15.25

Copper, Brass, Bronze

Cents per pound, freight prepaid on 200 lb.

	Extruded Shapes	Rods	Sheets
Copper	33.53		33.68
Copper, hot-rolled		30.03	
Copper, drawn		31.03	
Low brass	34.36*	31.39	31.70
Yellow brass	32.92*	29.85	30.16
Red brass	34.89*	31.92	32.23
Naval brass	30.28	29.03	34.97
Leaded brass	28.64	24.69	
Commercial bronze	35.68*	32.96	33.27
Manganese bronze	33.87	32.37	38.47
Phosphor bronze, 5 pct	53.95*	52.95	52.70
Muntz metal	29.80	28.55	32.99
Everdur, Herculoy, Olympic, etc.	37.24	37.50	38.56
Nickel silver, 10 pct	41.80	42.68	40.54
Architectural bronze	28.61		
*Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)

	Heavy	Turnings
Copper	19½	18½
Yellow brass	15½	14½
Red brass	17½	16½
Commercial bronze	17½	16½
Manganese bronze	15½	14½

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

Copper	
No. 1 copper, wire	18.00
No. 2 copper, wire	17.00
Light copper	16.00
Refining brass	15.50*

Aluminum

Mixed old cast	9.75
Mixed old clips	9.75
Mixed turnings	9.00
Pots & pans	10.00
Low copper	10.50
*Dry copper content	

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	17.00
No. 2 copper, wire	16.00
Light copper	15.00
No. 1 composition	14.00
No. 1 comp. turnings	13.75
Low brass	12.00
Brass pipe	12.00
Radiators	12.00
Heavy yellow brass	10.75

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire	16	—16½
No. 2 heavy copper and wire	15	—15½
Light copper	14	—14½
Auto radiators (unsweated)	9	—9½
No. 1 composition	11½	—12
No. 1 composition turnings	11	—11½
Clean red car boxes	9¼	—9¾
Cocks and faucets	9¼	—9¾
Mixed heavy yellow brass	7	—7½
Old rolled brass	7½	—8
Brass Pipe	9	—9½
New soft brass clippings	11¼	—11¾
Brass rod ends	9¾	—10¼
No. 1 brass rod turnings	9¼	—9¾

Aluminum

Alum. pistons with struts	4½	—5
Aluminum crankcases	6½	—7
2S aluminum clippings	9	—9½
Old sheet & utensils	7	—7½
Mixed borings and turnings		—2
Misc. cast aluminum	6½	—7
Dural clips (24S)	6	—6½

Zinc

New zinc clippings	7	—7½
Old zinc	5	—5½
Zinc routings	3	—3½
Old die cast scrap	3	—3½

Nickel and Monel

Pure nickel clippings	16	—17
Clean nickel turnings	12½	—13
Nickel anodes	16	—17
Nickel rod ends	16	—17
New Monel clippings	12	—13
Clean Monel turnings	7	—8
Old sheet Monel	10	—10½
Old Monel castings	7½	—8
Inconel clippings	8	—8½
Nickel silver clippings, mixed	8	—8½
Nickel silver turnings, mixed	6½	—7

Lead

Soft scrap lead	12	—12½
Battery plates (dry)	7	—7½

Magnesium Alloys

Segregated solids	7½	—8
Castings	4½	—5½

Miscellaneous

Block tin	75	—77
No. 1 pewter	60	—62
No. 1 auto babbitt	45	—47
Mixed common babbitt	13½	—14
Solder joints	16½	—17
Siphon tops	45	—47
Small foundry type	16	—16½
Monotype	15	—15½
Lino. and stereotype	14	—14½
Electrotype	11½	—12
New type shell cuttings	14½	—15
Clean hand picked type shells	6½	—7
Lino and stereo dross	6½	—7
Electro dross	4½	—5

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UNITED STATES STEEL

Market Is Active As Prices Soften

New York

... For the first time in months many mills showed a reluctance to place orders at current formula prices. Over the past week, as a reflection of the commodity price break and general uncertainty, markets have softened and scrap has flowed more freely than at any time in the past six months.

The Chicago market, often the trailblazer in such movements, showed the most marked weakening. Two mills there turned down steel scrap at \$1.50 below formula with at least two brokers known to be offering at this price.

Overall demand for openhearth material has remained good, as many mills are anxious about their stockpiles and are taking this opportunity to get their orders filled. But few are trying to push things to the extent of placing orders beyond the end of this month—indicating the general feeling that the market is not just stabilized, but is likely to soften further.

Warmer weather contributed to the market activity with a general Valentine's Day rain helping to open up some of the smaller yards which had been frozen since the Xmas week blizzard.

Cast scrap becomes more and more localized in many areas as on-the-spot demand has made shipment for higher prices an unnecessary trouble and expense. Cast items showed no general trend, being slightly stronger in some markets and somewhat weaker in others.

PITTSBURGH — Warmer weather at the beginning of this week was a hopeful sign to mills with large outstanding orders. Buyers are still keeping their fingers crossed—a bad break in the weather would make it difficult to fill some of the large commitments on time. Price activity was limited: short rails were \$1 higher, so was cast iron scrap. Biggest threat to the local market is higher prices in northern New York. Several brokers report material that would normally come here is going to Buffalo instead. Even with the formula springboard, district buyers can't compete. Shipments into the district were a little better last week and are expected to pick up more this week.

CHICAGO—Firm offers early last week by at least two brokers at \$38 delivered

on openhearth scrap was turned down by two mills although another mill did buy a small tonnage. Early in the week it appeared lower prices were a certainty, although lack of sufficient tonnages at the lower figure by enough buyers made a spread necessary. Railroad specialties continued to drift a little lower with the exception of the cast iron items. Mills reported heavy shipments against old orders and expect to be laying scrap on the ground in a matter of days.

PHILADELPHIA — Orders for No. 1 melting were not renewed last week and all brokers have completed their commitments for old orders. No. 2 melting grades were sold during the week at \$39, a reduction of \$1. Turnings were sold at \$34 and there is no premium being paid for shoveling. Low phos grades are selling at \$1.50 reduction. Cast grades are all selling at higher prices because of the active competition for cast by mills and foundries. Dealers are reported to be actively seeking business, scenting a further market decline. Scrap shipments by boat arrived in this area during the week. Railway steel scrap is reported to have been sold in this district at \$44.50.

CLEVELAND — Scrap is tight. While there was a slight improvement in openhearth shipments the first part of the week, consumers could use considerably more than they are getting and are beginning to wonder what comes next. Lower prices are thought to be a possibility within 30 to 60 days, or as soon as good weather comes to stay. Despite reports that scrap has been refused at formula prices, the market is by no means weak. A lot of orders are out, but shipments are the proving factor. Some brokers are short, and in some sectors the market is jittery. Key to the market in the next 60 days could easily be the price of gray market sheets.

DETROIT—Resumption of car assemblies, the recent break in the commodity price market and the growing conviction that the scrap price formula is going to stick have resulted in an easier scrap situation in Detroit. While easing of the market is not yet reflected in lower prices, the trend is in this direction. Also, the fast pace the auto industry is planning for itself and the return of milder weather should prove to be favorable factors in relieving the present tightness. Most sources here feel, however, that cast iron grades are destined to hold close to existing high levels until the present die programs are out of the way.

BIRMINGHAM — Attributed at least in part to the break in the commodity and stock markets, movement in all grades of scrap is heavier here than at any time in the last six months. This heavy movement is under way despite washed out country roads that have retarded delivery of agricultural scrap to yards. There has been

no change in prices but trade sources report that mills are making no contracts beyond Feb. 29th.

BUFFALO — The market showed signs of fading around the outer edges as consumers backed away from top prices following a display of strength early last week and a pick up in the flow of mill scrap. Overall demand continued good, however, and mills placed additional orders for openhearth grades at the formula. Outside figures for turnings were reduced \$1.75 a ton with the completion of orders from Canada, but elsewhere the listings were unchanged. One large foundry was reported bidding \$5 under the market for mixed cast scrap.

NEW YORK — The market was comparatively slow considering the rising activity in evidence elsewhere. Formula prices were still very much in effect for steel-making grades, and cast items continued strong with a wide range of prices being asked depending on how tightly the foundry was squeezed. Cast scrap becomes more and more localized as spot demands make shipment to greener fields unnecessary.

BOSTON—Prices are now definitely on a "formula" basis. Consumers no longer pay premiums for shoveling turnings, mixed borings and turnings and machine shop turnings. Heavy steel is \$31.65 to \$31.90, mostly \$31.90. Cast is another story. Two distress sales are reported at \$70 a ton, but generally the market is \$60 to \$65 with supplies niggardly. Freight cars are scarce, with shipments limited as a result. Many yards were unfrozen by a Valentine Day warm rain.

ST. LOUIS — Foundries which have been heavy buyers of railroad specialties are now out of the market and there has been a softening of prices as a result. Some items are off \$1 to \$3 a ton. Steel mills have been buying substantial tonnages of No. 2 heavy melting at prices quoted. Receipts in the market have been only fair, primarily because of inclement weather.

CINCINNATI—Two factors, much caution and little trading, in the openhearth grades have made the market here pretty slow. Cast grades are strong, but not as strong as they were a couple weeks ago, and foundries are beginning to back away from the high prices.

TORONTO—Trading in scrap iron and steel continues on a conservative scale, but this condition is entirely due to shortage of materials. Local dealers again reported receipts at a minimum and while there has been some improvement in weather conditions it has failed to bring forth larger scrap offerings. Rural district are still tied up with heavy snow and no scrap is being received from outside points. From industrial plants the flow of scrap is steady but involves no large tonnages.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$40.50
RR. hvy. melting	\$41.00 to 41.50
No. 2 hvy. melting	40.50
RR. scrap rails	54.00 to 55.00
Rails 2 ft and under	59.00 to 60.00
No. 1 comp'd bundles	40.50
Hand bld. new shts.	40.50
Hvy. axle turn.	41.50 to 42.00
Hvy. steel forge turn.	41.50 to 42.00
Mach. shop turn.	35.00 to 35.50
Shoveling turn.	38.50 to 39.00
Mixed bor. and turn.	37.00 to 37.50
Cast iron borings	38.00 to 39.00
No. 1 cupola cast	59.00 to 60.00
Hvy. breakable cast.	45.00 to 46.00
Malleable	66.00 to 67.00
RR. knuck. and coup.	54.00 to 54.50
RR. coil springs	54.00 to 54.50
RR. leaf springs	54.00 to 54.50
Rolled steel wheels	54.00 to 54.50
Low phos.	47.00 to 48.00

CHICAGO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$38.00 to \$39.50
No. 2 hvy. melting	38.00 to 39.50
No. 1 bundles	38.00 to 39.50
No. 2 dealers' bundles	38.00 to 39.50
Bundled mach. shop turn.	38.00 to 39.50
Galv. bundles	36.00 to 37.50
Mach. shop turn.	33.00 to 34.50
Short shov. turn.	35.00 to 36.50
Cast iron borings	34.00 to 35.50
Mix. borings & turn.	33.00 to 34.50
Low phos. hvy. forge	44.00 to 46.00
Low phos. plates	41.50 to 42.50
No. 1 RR. hvy. melt.	41.25 to 41.75
Rerolling rails	49.50 to 50.00
Miscellaneous rails	45.00 to 48.00
Angles & splice bars	51.00 to 52.00
Locomotive tires, cut	52.00 to 53.00
Cut bolster & side frames	45.00 to 48.00
Standard stl. car axles	57.00 to 58.00
No. 3 steel wheels	51.00 to 51.50
Couplers & knuckles	52.00 to 53.00
Rails 2 ft and under	50.00 to 55.00
Malleable	70.00 to 71.00
No. 1 mach. cast.	64.00 to 65.00
No. 1 agricul. cast.	62.00 to 63.00
Heavy breakable cast.	55.00 to 56.00
RR. grate bars	60.00 to 62.00
Cast iron brake shoes	60.00 to 61.00
Cast iron carwheels	58.00 to 60.00

CINCINNATI

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$38.50 to \$39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 bundles	38.50 to 39.50
Mach. shop turn.	33.00 to 33.50
Shoveling turn.	35.00 to 35.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	32.50 to 33.00
Low phos. plate	50.00 to 51.00
No. 1 cupola cast	67.00 to 68.00
Hvy. breakable cast	56.00 to 58.00
Rails 18 in. & under	61.00 to 63.00
Rails random length	55.00 to 56.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$33.00 to \$35.00
No. 2 hvy. melting	31.65 to 31.90
Nos. 1 and 2 bundles	31.65 to 31.90
Busheling	31.65 to 31.90
Shoveling turn.	28.90
Machine shop turn.	26.90
Mixed bor. & turn.	26.90
Cl'n cast. chem. bor.	34.00 to 35.00
No. 1 machinery cast.	60.00 to 65.00
No. 2 machinery cast.	60.00 to 65.00
Heavy breakable cast.	60.00 to 65.00
Stove plate	45.00 to 50.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	\$35.50
No. 2 hvy. melting	35.50
No. 1 bundles	35.50
New busheling	35.50
Flashings	35.50
Mach. shop turn.	\$30.00 to 30.50
Shoveling turn.	31.00 to 31.50
Cast iron borings	31.00 to 31.50
Mixed bor. & turn.	31.00 to 31.50
Low phos. plate	39.50 to 40.50
No. 1 cupola cast	60.00 to 63.00
Heavy breakable cast.	52.00 to 56.00
Stove plate	52.00 to 56.00
Automotive cast	60.00 to 63.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$40.50 to \$41.50
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	38.00 to 39.00
Mach. shop turn.	33.00 to 34.00
Shoveling turn.	33.00 to 34.00
Mixed bor. & turn.	33.00 to 34.00
Clean cast chemical bor.	40.00 to 42.00
No. 1 machinery cast.	65.00 to 66.00
No. 1 mixed yard cast.	63.00 to 65.00
Hvy. breakable cast.	59.00 to 60.00
Clean auto cast.	63.00 to 65.00
Hvy. axle forge turn.	40.50 to 41.50
Low phos. plate	45.50 to 46.50
Low phos. punchings	45.50 to 46.50
Low phos. bundles	44.50 to 45.50
RR. steel wheels	51.00 to 52.00
RR. coil springs	51.00 to 52.00
RR. malleable	70.00 to 75.00

ST. LOUIS

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$41.00 to \$42.00
No. 2 hvy. melting	37.50 to 38.50
Bundled sheets	37.50 to 38.50
Mach. shop turn.	33.00 to 33.50
Locomotive tires, uncut.	46.00 to 48.00
Mis. std. sec. rails	50.00 to 51.00
Rerolling rails	52.00 to 53.00
Steel angle bars	57.00 to 58.00
Rails 3 ft and under	56.00 to 58.00
RR. steel springs	50.00 to 51.00
Steel car axles	52.00 to 53.00
Grate bars	56.00 to 57.00
Brake shoes	54.00 to 55.00
Malleable	71.00 to 72.00
Cast iron car wheels	54.00 to 55.00
No. 1 machinery cast.	64.00 to 65.00
Hvy. breakable cast.	52.00 to 53.00

BIRMINGHAM

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$37.50 to \$38.50
No. 2 hvy. melting	37.50 to 38.50
No. 2 bundles	37.50 to 38.50
No. 1 busheling	37.50 to 38.50
Long turnings	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast	60.00 to 65.00
Stove plate	55.00 to 58.00
No. 1 RR. hvy. melt.	37.50 to 38.50
Steel axles	38.00 to 39.00
Scrap rails	44.00 to 45.00
Rerolling rails	52.00 to 54.00
Angles & splice bars	47.50 to 50.00
Rails 3 ft. & under	52.00 to 56.00
Cast iron carwheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$40.00 to \$40.50
No. 2 hvy. melting	40.00 to 40.50
Mach. shop turn.	35.00 to 35.50
Short shov. turn.	37.00 to 37.50
Cast iron borings	36.00 to 36.50
Low phos.	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$34.50
No. 2 hvy. melting	34.50
No. 2 bundles	34.50
Comp. galv. bundles	34.50
Mach. shop turn.	\$30.00 to 31.00
Mixed bor. & turn.	30.00 to 31.00
Shoveling turn.	30.00 to 31.00
No. 1 cupola cast.	58.00 to 61.00
Clean auto cast	58.00 to 61.00
Hvy. breakable cast.	55.00 to 56.00
Charging box cast.	55.00 to 56.00
Stove plate	51.00 to 52.00
Unstrp. motor blks.	50.00 to 51.00
Cl'n chem. cast bor.	34.50 to 35.50

BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$44.00 to \$46.00
No. 2 hvy. melting	39.75
No. 1 bundles	39.75
No. 2 bundles	39.75
No. 1 busheling	39.75
Mach. shop turn.	34.75 to 35.25
Shoveling turn.	36.75 to 37.25
Cast iron borings	35.75
Mixed bor. & turn.	34.75
Mixed cupola cast.	60.00 to 62.00
Charging box cast.	54.00 to 55.00
Stove plate	58.00 to 60.00
Clean auto cast.	62.00 to 65.00
RR. malleable	70.00 to 75.00
Small indl. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	58.00 to 59.00
Rails 3 ft & under	60.00 to 61.00
RR. steel wheels	62.00 to 63.00
Cast iron carwheels	52.00 to 53.00
RR. coil & leaf spgs.	52.00 to 53.00
RR. knuckles & coup.	52.00 to 53.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$39.50 to \$40.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 1 busheling	39.50 to 40.00
Drop forge flashings	39.50 to 40.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	36.50 to 37.00
Steel axle turn.	39.50 to 40.00
Cast iron borings	35.50 to 36.00
Mixed bor. & turn.	35.50 to 36.00
Low phos.	44.50 to 45.00
No. 1 machinery cast.	65.00 to 70.00
Malleable	75.00 to 80.00
RR. cast.	70.00 to 73.00
Railroad grate bars	60.00 to 62.00
Stove plate	60.00 to 62.00
RR. hvy. melting	40.00 to 40.50
Rails 3 ft & under	63.00 to 65.00
Rails 18 in. & under	63.00 to 65.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	\$25.00
No. 2 hvy. melting	25.00
No. 2 bales	25.00

Per gross ton delivered to consumer:	
No. 3 bales	\$19.50
Mach. shop turn.	16.00
Elec. furn. 1 ft und.	\$32.00 to 34.00
No. 1 cupola cast.	32.00 to 33.00
RR. hvy. melting	26.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$25.50
No. 2 hvy. melting	25.50
No. 1 bales	25.50
No. 2 bales	25.50
No. 3 bales	19.50
Mach. shop turn.	17.50
No. 1 cupola cast.	\$36.00 to 40.00
RR. hvy. melting	26.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$26.50
Elec. furn. 1 ft and und.	\$27.50 to 30.00
No. 1 cupola cast.	30.00 to 40.00
RR. hvy. melting	27.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting	\$22.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact, prep'd	21.00*
Bushelings, new fact, unprep'd	16.00*
Short steel turnings	17.00*
No. 1 cast	\$42.00 to 43.00
No. 2 cast	35.00 to 37.00

*Celling Price.

Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(cents per pound)	1948	1948	1948	1947
Hot-rolled sheets	2.80	2.80	2.80	2.50
Cold-rolled sheets	3.55	3.55	3.55	3.20
Galvanized sheets (10 ga.)	3.95	3.95	3.95	3.55
Hot-rolled strip	2.80	2.80	2.80	2.50
Cold-rolled strip	3.55	3.55	3.55	3.20
Plates	2.95	2.95	2.95	2.65
Plates wrought iron	7.25	7.25	6.85	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50

Tin and Terneplate:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(dollars per base box)				
Tinplate (1.50 lb) cokes	\$6.80	\$6.80	\$6.80	\$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90

Bars and Shapes:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(cents per pound)				
Merchant bars	2.90	2.90	2.90	2.60
Cold-finished bars	3.55	3.55	3.55	3.20
Alloy bars	3.30	3.30	3.30	3.05
Structural shapes	2.80	2.80	2.80	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	26.00
Wrought iron bars	8.65	8.65	7.15	6.15

Wire:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(cents per pound)				
Bright wire	3.55	3.55	3.55	3.30

Rails:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(dollars per 100 lb)				
Heavy rails	\$2.75	\$2.75	\$2.75	\$2.50
Light rails	3.10	3.10	3.10	2.85

Semifinished Steel:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(dollars per gross ton)				
Rerolling billets	\$45.00†	\$45.00	\$45.00	\$42.00
Slabs, rerolling	45.00†	45.00	45.00	42.00
Forging Billets	54.00†	55.00	55.00	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00

Wire Rods and Skelp:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(cents per pound)				
Wire rods	2.80	2.80	2.80	2.55
Skelp	2.90	2.60	2.60	2.35
*Net ton				

Pig Iron:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(per gross ton)				
No. 2, foundry, Phila.	\$44.61	\$44.61	\$44.61	\$32.51
No. 2, Valley furnace	39.50	39.50	39.50	30.50
No. 2, Southern Cin'ti.	43.28	43.28	43.28	31.75
No. 2, Birmingham	37.38	37.38	37.38	26.88
No. 2, foundry, Chicago†	39.00	39.00	39.00	30.50
Basic del'd Philadelphia	44.11	44.11	44.11	33.67
Basic, Valley furnace	39.00	39.00	39.00	30.00
Malleable, Chicago†	39.50	39.50	38.50	30.50
Malleable, Valley	39.50	39.50	39.50	30.50
Charcoal, Chicago	62.46	62.46	62.46	42.99
Ferromanganese†	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡ For carlots at seaboard.

Scrap:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(per gross ton)				
Heavy melt'g steel, P'gh.	\$40.50	\$40.50	\$40.50	\$35.50
Heavy melt'g steel, Phila.	41.00	41.50	45.50	33.50
Heavy melt'g steel, Ch'go	38.75	39.50	39.50	32.25
No. 1, hy. comp. sheet, Det.	35.50	35.50	35.25	30.00
Low phos. Young'n	45.25	45.25*	47.75	37.25
No. 1, cast, Pittsburgh	59.50	58.50*	56.75	42.50
No. 1, cast, Philadelphia	65.50	64.00*	59.00	46.00
No. 1, cast, Chicago	67.50	64.50*	69.50	44.25
*Revised				

Coke, Connellsville:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(per net ton at oven)				
Furnace coke, prompt	\$12.50	\$12.50	\$12.50	\$9.00
Foundry coke, prompt	14.00	14.00	14.00	10.25

Nonferrous Metals:	Feb. 17, 1948	Feb. 10, 1948	Jan. 20, 1948	Feb. 18, 1947
(cents per pound to large buyers)				
Copper, electro. Conn.	21.50	21.50	21.50	19.75
Copper, Lake Conn.	21.625	21.625	21.625	19.625
Tin, Grade A, New York	94.00	94.00	94.00	70.00
Zinc, East St. Louis	12.00	12.00	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	12.80
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.25

In accordance with usual practice, THE IRON AGE finished steel composite price has been revised this week, following receipt of fourth quarter 1947 shipment data. The change in the pattern of shipments produces a revised tentative price quotation for last week, and one month ago of 3.19411¢ per lb. An increase in pipe prices effective this week places the composite for this week at 3.23940¢. All shipment data by American Iron & Steel Institute.

Composite Prices . .

FINISHED STEEL (Base Price)	
Feb. 17, 1948	3.23940¢ per lb.
One week ago	3.19411¢* per lb.
One month ago	3.19411¢* per lb.
One year ago	2.87255¢ per lb.
*Revised	

HIGH	LOW
1948.... 3.23940¢ Feb. 17	3.19411¢ Jan. 6
1947.... 3.19411¢ Oct. 7	2.87118¢ Jan. 7
1946.... 2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945.... 2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944.... 2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943.... 2.29176¢	2.29176¢
1942.... 2.28249¢	2.28249¢
1941.... 2.43078¢	2.43078¢
1940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939.... 2.35367¢ Jan. 3	2.26689¢ May 16
1938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935.... 2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934.... 2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933.... 1.95578¢ Oct. 3	1.75836¢ May 2
1932.... 1.89196¢ July 5	1.83901¢ Mar. 1
1931.... 1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930.... 2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929.... 2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON	
.....\$40.37	per gross ton.....
.....\$40.17	per gross ton.....
.....\$40.08	per gross ton.....
.....\$30.15	per gross ton.....

HIGH	LOW
\$40.37 Feb. 17	\$39.58 Jan. 6
37.98 Dec. 30	30.14 Jan. 7
30.14 Dec. 10	25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
\$23.61	\$23.61
23.61	23.61
23.61	23.61
\$23.61 Mar. 20	\$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12
23.25 June 21	19.61 July 6
23.25 Mar. 9	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11
18.84 Nov. 5	17.83 May 14
17.20 May 1	16.90 Jan. 27
16.90 Dec. 5	13.56 Jan. 3
14.81 Jan. 5	13.56 Dec. 6
15.90 Jan. 6	14.79 Dec. 15
18.21 Jan. 7	15.90 Dec. 16
18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL	
.....\$40.08	per gross ton.....
.....\$40.50	per gross ton.....
.....\$41.83	per gross ton.....
.....\$33.75	per gross ton.....

HIGH	LOW
\$41.83 Jan. 20	\$40.00 Jan. 6
42.58 Oct. 28	29.50 May 20
31.17 Dec. 24	19.17 Jan. 1
19.17 Jan. 2	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
\$19.17	\$19.17
19.17	19.17
\$22.00 Jan. 7	\$19.17 Apr. 10
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8
13.42 Dec. 10	10.33 Apr. 29
13.00 Mar. 13	9.50 Sept. 25
12.25 Aug. 8	6.75 Jan. 3
8.50 Jan. 12	6.43 July 5
11.33 Jan. 6	8.50 Dec. 29
15.00 Feb. 18	11.25 Dec. 9
17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) to 0.035 to 0.075 in. thick by 3/4 to 3 1/2 in. wide. (16) Delivered Los Angeles; add 1/2¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. Some producers charge (18) \$2 more. (19) \$1 more.

Basing Points	Pitts- burgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	San Francisco, Los Angeles, Seattle	DELIVERED TO		
												Detroit	New York	Phila- delphia
INGOTS														
Carbon, rerolling														
Carbon, forging	\$46.00	(per net ton)												
Alloy	\$56.00													
BILLETS, BLOOMS, SLABS														
Carbon, rerolling ¹	\$45.00 ¹⁸	\$45.00 ¹⁸	\$45.00 ¹⁸	\$47.00	\$45.00 ¹⁸	\$45.00 ¹⁸	(per net ton)							
Carbon, forging billets	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	(per net ton)							
Alloy	\$66.00	\$66.00				\$66.00								
SHEET BARS														
PIPE SKELP	2.90¢						2.90¢							
WIRE RODS	2.80¢ ¹⁹	2.80¢ ¹⁹		2.80¢ ¹⁹	2.85¢		(Worcester = 2.90¢ ¹⁹)					3.52¢ ¹⁹		
SHEETS														
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢			(Ashland, Ky. = 2.80¢)	3.54¢ ¹⁶	2.96¢	3.148¢
Cold-rolled ¹	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.71¢	4.00¢
Galvanized (10 gage)	3.95¢	3.95¢	3.95¢		3.95¢		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland = 3.95¢)	4.62¢ ¹⁶		4.298¢
Enameling (12 gage)	3.95¢	3.95¢	3.95¢	3.95¢			3.95¢		4.05¢	3.95¢			4.11¢	4.468¢
Long ternes ² (10 gage)	4.05¢		4.05¢											4.568¢
STRIP														
Hot-rolled ³	2.80¢	2.80¢	2.80¢	2.80¢ ¹⁸	2.80¢		2.80¢					3.60¢ ¹⁶	2.96¢	3.318¢
Cold-rolled ⁴	3.55¢	3.65¢	3.65¢	3.55¢			3.55¢				(Worcester = 3.75¢)		3.71¢	4.068¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.618¢
TINPLATE														
Cokes, 1.50 lb ⁵ , base box	\$6.80	\$6.80	\$6.80		\$6.90			\$6.90	\$6.90		(Warren, Ohio = \$6.80)		\$7.248	\$7.140
Electro, box (0.25 lb 0.50 lb 0.75 lb)														
TERNES, MFG., special coated														
BLACKPLATE, CANMAKING														
55 lb to 70 lb														
75 lb to 95 lb														
100 lb to 128 lb														
BLACKPLATE, h. a. 29 ga¹¹	4.75¢	4.75¢	4.75¢		4.85¢			4.85¢	4.85¢				5.198¢	5.090¢
BARs														
Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢ ¹⁶	3.06¢	3.35¢
Rail steel ⁶														3.358¢
Reinforcing (billet) ⁷	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢ ¹⁶	3.098¢	2.990¢
Reinforcing (rail)														
Cold-finished ⁸	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.71¢	4.00¢
Alloy, hot-rolled	3.30¢	3.30¢	3.30¢			3.30¢	3.30¢			(Bethlehem, Massillon, Canton = 3.30¢)				3.432¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢				(Canton = 4.10¢)				
PLATE														
Carbon steel ¹²	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢			(Coatesville = 3.45¢, Claymont = 3.65¢, Geneva, Utah = 3.10¢)		3.838¢ ¹⁴	3.298¢	3.190¢
Floor plates	4.20¢	4.20¢		4.20¢										4.716¢
Alloy	3.80¢	3.80¢	3.80¢							(Coatesville = 4.80¢)				4.318¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢				(Geneva, Utah = 2.95¢, Bethlehem = 2.80¢)		3.43¢ ¹⁰	3.048¢	2.932¢
SPRING STEEL, C-R														
0.08 to 0.40 carbon	3.55¢			3.55¢						(Worcester = 3.75¢)				
0.41 to 0.60 carbon	5.05¢			5.05¢						(Worcester = 5.25¢)				
0.61 to 0.80 carbon	5.65¢			5.65¢						(Worcester = 5.85¢)				
0.81 to 1.05 carbon	7.15¢			7.15¢						(Worcester = 7.35¢)				
1.06 to 1.35 carbon	9.45¢			9.45¢						(Worcester = 9.65¢)				
MANUFACTURERS' WIRE⁹														
Bright	3.55¢	3.55¢		3.55¢	3.55¢					(Worcester = 3.65¢, Duluth = 3.60¢)		4.56¢ ¹³	4.022¢	4.008¢
Galvanized										Add proper size extra and galvanizing extra to Bright Wire Base				
Spring (high carbon)	4.60¢	4.60¢		4.60¢						(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)		5.737¢ ¹³	5.072¢	4.964¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢							3.75¢	3.756¢

PRICES

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 448
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation		Subject to negotiation			
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	Subject to negotiation		Subject to negotiation			
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation		Subject to negotiation			
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt, Beth.	Subject to negotiation		Subject to negotiation			
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-r, P'gh, Chi, Clevel, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Clevel, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Clevel, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Clevel, Balt, Reading, Dunkirk, Canton, W. Leechburg	32.46	30.30	23.80	24.34	34.82	58.28
Red, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	28.78
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$2.40
18	4	1	—	5	\$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢
High-carbon-chromium*					47¢
Oil hardening manganese*					26¢
Special carbon*					24¢
Extra carbon*					20¢
Regular carbon*					17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, armature grade through motor; f.o.b. Granite City, add 45¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	\$2.75
Angle splice bars, 100 lb	3.85
(F.o.b. basing points)	per 100 lb
Light rails (from billets)	\$3.10

Base per lb

Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.65¢
Tie plates, Pittsburg, Calif.	3.80¢
Track bolts	7.00¢
Track bolts, heat treated, to railroads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, St. Louis, Kansas City, Minnequa, Colo.; Birmingham; tie plates alone—Steelton, Pa., Buffalo, Pa.; spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

20x14 in. 20x28 in.	\$7.05	\$14.10
8-lb coating I.C.	.....	.....

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	.....
Inconel-clad		
10 pct, f.o.b. Coatesville..	30.00	.....
Monel-clad		
10 pct, f.o.b. Coatesville..	24.00	.....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	.....	9.00

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Birmingham

	Base Column per keg	San Francisco
Standard & coated nails*	94	115
Galvanized nails*	94	115
Woven wire fence†	100	123
Fence posts, carloads††	105	...
Single loop bale ties	99	123
Galvanized barbed wire**	113	133
Twisted barbless wire	113	...

*Also Duluth; Worcester, 6 columns higher. † 15 1/2 gage and heavier. ** On 80-rod spools, in carloads. †† Pittsburgh, Duluth only.

	Base per 100 lb	San Francisco
Annealed fence wire †	\$4.20	\$5.21
Annealed, galv. fencing †	4.65	5.66
Cut nails, carloads ††	6.30	...

† Add 10¢ at Worcester. †† Pittsburgh only, less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayar R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	.....	5.30	5.30	5.30	5.30	5.30
Galvanized	.....	6.00	.....	.....	.....	6.00	.....	.....	.....
Strip									
Hot-rolled	4.30	4.30	4.30	.....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	.....	.....	5.30	.....	.....	5.30	5.30	5.30	5.30†
Shapes	.....	4.30	.....	.....	4.30	4.30	4.30	4.30	.....
Beams	.....	4.30	.....	.....	.....	4.30	.....	.....	.....
Bars									
Hot-rolled	4.45	4.45	4.45	.....	.....	4.45	4.45	4.45	4.45
Bar shapes	.....	4.45	.....	.....	4.45	4.45	4.45	4.45	.....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PRICES

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel butt weld and seamless.
Others f.o.b. Pittsburgh only
Base price, \$200.00 per net ton

Standard, threaded & coupled

Steel, butt weld	Black	Galv.
1/2-in.	47	29 1/2
3/4-in.	50	32 1/2
1-in.	52 1/2	36 1/2
1 1/4-in.	53	37
1 1/2-in.	53 1/2	37 1/2
2-in.	54	38
2 1/2 and 3-in.	54 1/2	38 1/2
Wrought iron, butt weld		
1/2-in.	+ 7	+ 31
3/4-in.	2 1/2	+ 21
1 and 1 1/4-in.	8	+ 12 1/2
1 1/2-in.	13 1/2	+ 9
2-in.	14	+ 8 1/2
Steel, lap weld		
2-in.	44 1/2	28
2 1/2 and 3-in.	48 1/2	32
3 1/2 to 6-in.	50 1/2	34
Steel, seamless		
2-in.	43 1/2	27
2 1/2 and 3-in.	46 1/2	30
3 1/2 to 6-in.	48 1/2	32
Wrought iron, lap weld		
2-in.	5 1/2	+ 16
2 1/2 to 3 1/2-in.	8	+ 12
4-in.	12	+ 6 1/2
4 1/2 to 8-in.	10	+ 8

Extra Strong, plain ends

Steel, butt weld		
1/2-in.	46	30
3/4-in.	50	34
1-in.	52	37
1 1/4-in.	52 1/2	37 1/2
1 1/2-in.	53	38
2-in.	53 1/2	38 1/2
2 1/2 and 3-in.	54	39
Wrought iron, butt weld		
1/2-in.	+ 2 1/2	+ 25
3/4-in.	3 1/2	+ 19
1 to 2-in.	13	+ 8 1/2
Steel, lap weld		
2-in.	43 1/2	28
2 1/2 and 3-in.	48 1/2	32
3 1/2 to 6-in.	52	36 1/2
Steel, seamless		
2-in.	42 1/2	27
2 1/2 and 3-in.	46 1/2	31
3 1/2 and 6-in.	50	34 1/2
Wrought iron, lap weld		
2-in.	8 1/2	+ 12 1/2
2 1/2 to 4-in.	17 1/2	+ 2
4 1/2 to 6-in.	13	+ 6 1/2

Basing discounts for standard pipe are for threads and couplings. For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe, 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt weld. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots, cut length 1/4 to 2 1/4 ft. inclusive.

OD in.	Gage	Hot Rolled	Cold Drawn	Electric Weld Hot Rolled	Electric Weld Cold Drawn
2	13	\$17.84	\$20.99	\$16.17	\$19.39
2 1/2	12	23.99	28.21	21.75	26.06
3	12	26.68	31.40	24.18	29.00
3 1/2	11	33.35	39.26	30.23	36.27
4	10	41.40	48.70	37.53	44.99

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	\$91.12
6-in. to 24-in. del'd New York	89.18
6-in. to 24-in., Birmingham	79.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	105.90
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

Percent Off List

1/2 in. & smaller x 6 in. & shorter	45
9/16 & 5/8 in. x 6 in. & shorter	46
3/4 in. & larger x 6 in. & shorter	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long	44
Lag, all diam x 6 in. & shorter	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	43
9/16 to 1 in. inclusive	42
1 1/8 to 1 1/2 in. inclusive	40
1 3/8 in. and larger	35
On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.	

Semifin. Hexagon Nuts

	USS	SAE
7/16 in. and smaller	46	
1/2 in. and smaller	44	
1/2 in. through 1 in.	44	
9/16 in. through 1 in.	43	
1 1/8 in. through 1 1/2 in.	41	42
1 3/8 in. and larger	35	

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate	65 and 10
In bulk	75
On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.	

Large Rivets (1/2 in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$5.65
F.o.b. Lebanon, Pa.	5.80

Small Rivets (7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55

Cap and Set Screws

(In packages) Percent Off List

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
1/2 to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, oval points	56
Milled studs, oval points	29
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	37
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.	

FLUORSPAR

Metallurgical grade, f.o.b. producing plant

Effective CaF ₂ Content:	Base price per short ton
70% or more	\$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.55
High phosphorus	5.55
Prices quoted retroactive to Jan. 1, 1947.	

METAL POWDER

Prices in cents per pound in ton lots f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28 1/2¢
Copper, electrolytic, 100 and 325 mesh	30 1/2¢ to 34 1/2¢
Copper, reduced, 150 and 200 mesh	30 1/2¢ to 32¢
Iron, commercial, 100, 200, 325 mesh 96 + % Fe carlots	10¢ to 17¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags	7.4¢ to 8.3¢
Domestic sponge iron, minus 48 mesh	10¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	8¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	.63¢ to .80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	44¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	39 1/2¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	.90¢ to \$1.75
Aluminum, 100, 200 mesh, carlots	.23¢ to .29¢
Antimony, 100 mesh	44¢
Cadmium, 100 mesh	\$2.00
Chromium, 100 mesh and finer	\$1.025
Lead, 100, 200 & 300 mesh 20 1/2¢ to 25 1/2¢	
Manganese, minus 325 mesh and coarser	59¢
Nickel, 100 mesh	51 1/2¢
Silicon, 100 mesh	29¢
Solder powder, 100 mesh.. 8 1/2¢ plus metal	
Stainless steel, 302, minus 100 mesh	75¢
Tin, 100 mesh	90¢
Tungsten metal powder, 98% 99%, any quantity, per lb.	\$2.90
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	\$2.61
Under 100 lb	\$2.90

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa.	\$12.00 to \$13.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	\$18.60
Chicago, f.o.b.	17.50
New England, del'd	19.75
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	17.75
Swedeland, Pa., f.o.b.	17.75
Buffalo, del'd	20.15
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.69
St. Louis, del'd	18.03
Birmingham, del'd	15.76

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
No. 1 Ohio	\$67.00
First quality, Pa., Md., Ky., Mo., Ohio	73.00
First quality, New Jersey	78.00
Sec. quality, Pa., Md., Ky., Mo., Ohio	67.00
Sec. quality, New Jersey	70.00
No. 2 Ohio	59.00
Ground fire clay, net ton, bulk	10.50
Silica Brick	
Pennsylvania and Birmingham	\$73.00
Chicago District and Alabama	82.00
Silica cement, net ton (Eastern)	12.50
East Chicago	13.50

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt.	
Plymouth Meeting, Chester	\$64.00

Magnesite Brick	
Standard, Balt. and Chester	\$86.00
Chemically bonded, Baltimore	75.00

Grain Magnesite	
std. 1/2-in. grains	
Domestic, f.o.b. Balt. and Chester in bulk, fines removed	\$51.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	27.00
In sacks with fines	31.50

Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$11.06

PRICES

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	\$4.51	\$5.78	\$5.91	\$4.83	\$5.73	\$4.86	\$4.57	\$4.88	\$5.58	\$8.52	\$8.67	\$10.13	\$10.28
New York	4.76	5.78 ¹	6.16	5.09	6.07	5.11	4.80	5.08	5.63	8.58	8.73	10.18	10.33
Boston	4.83	5.69	6.23 ¹²	5.61	6.87	5.18	4.91	5.04	5.69	8.20	8.35	9.50	9.65
Baltimore	4.33	.....	5.73	4.81	.....	4.78	4.73	4.86	5.56	.....	.....	.....	.....
Norfolk	4.90	.....	.....	5.30	.....	5.15	5.15	5.20	6.00	.....	.....	.....	.....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.20	8.35	9.50	9.65
Milwaukee	4.458	5.308	5.858	5.058	5.658	4.808	4.608	4.608	5.395	8.495	8.795	9.945	10.095
Cleveland	4.25	5.10 ¹	5.81	4.55	.....	4.60 ¹	4.68	4.40	5.10	8.51	8.66	9.50	9.65
Buffalo	4.25	5.10	6.05	5.25	5.70 ⁵	5.00	4.40 ²	4.40 ²	5.10	8.20	8.35	9.50	9.65
Detroit	4.10	5.26	6.07	4.77	5.67	4.92 ¹	4.82	4.82	5.26	8.82	8.97	10.09	10.24
Cincinnati	4.55	5.21	5.76	4.79	5.74	4.99	4.84	4.79	5.49	8.73	8.88	10.04	10.19
St. Louis	4.81	5.46	6.07	4.71	5.87	4.96	4.76	4.76	5.52	8.77	8.92	10.07	10.22
Pittsburgh	4.25	5.10 ¹	5.65	4.35	.....	4.60	4.40	4.40	5.10	8.20	8.37	9.50	9.65
St. Paul	4.68	5.63	6.08	4.78	.....	5.03	4.83	4.83	6.00	.....	.....	.....	.....
Omaha	5.262	.....	6.712	5.362	.....	5.612	5.412	5.412	6.112	.....	.....	.....	.....
Indianapolis	4.59	5.36	5.91	4.69	5.79	4.94	.....	4.74	5.44	.....	.....	.....	.....
Birmingham	4.45 ¹¹	.....	5.65	4.45 ¹¹	.....	4.65 ¹¹	4.40 ¹¹	4.40 ¹¹	5.43	.....	.....	.....	.....
Memphis	4.88 ¹¹	5.94 ¹	6.43	5.08 ¹¹	.....	5.23 ¹¹	5.03 ¹¹	5.03 ¹¹	5.94	.....	.....	.....	.....
New Orleans	*5.05 ¹¹	6.39 ¹	.....	5.25 ¹¹	.....	5.40 ¹¹	*5.20 ¹¹	*5.20 ¹¹	6.39 ⁶	.....	.....	.....	.....
Houston	5.75 ⁹	.....	7.38	6.00 ⁹	.....	5.85 ⁹	5.85 ⁹	5.35 ¹⁷	7.00	9.40	9.25	10.40	10.55
Los Angeles	5.75	7.35 ¹	7.40	6.05	8.70 ⁵	5.55	5.35	5.50	7.35 ¹⁴	9.70 ¹⁵	9.55 ¹⁰	11.15 ¹⁵	11.30 ¹⁵
San Francisco	5.40 ⁶	6.65	7.05	5.75 ⁶	8.70	5.50	5.20	5.05	7.50	9.70 ¹⁵	9.55 ¹⁵	11.15 ¹⁵	11.30 ¹⁵
Seattle	5.45 ⁴	7.25 ²	6.85	5.60 ⁴	.....	5.60 ⁴	5.25 ⁴	5.45 ⁴	7.45 ¹⁴	.....	8.95 ¹⁶	.....	11.30 ¹⁵
Portland	5.30 ⁴	7.10 ²	6.70	5.60 ⁴	.....	5.45 ⁴	5.25 ⁴	5.55 ⁴	7.45 ¹⁴	.....	.....	.....	.....
Salt Lake City	6.40	.....	7.85	6.70	.....	6.20	6.35	6.55	7.55	.....	.....	.....	.....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb;

strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and

over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham

† Up to ¾ in. thick and 90 in. wide.

‡ Add 40¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT* PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	40.00	40.50	41.00	41.50	.....	Boston	Everett	\$0.50 Arb.	.....	45.50	46.00	.....	.....
Birmingham	38.88	38.38-39.38	.....	.....	.....	Boston	Steelton	5.78	45.78	.....	.....	.....	51.78
Buffalo	40.00-45.00*	40.00-45.00*	40.50-46.00*	.....	.....	Brooklyn	Bethlehem	3.60	43.60	44.10	44.60	45.10	.....
Chicago	38.50	39.00	39.50	40.00	.....	Cincinnati	Birmingham	5.85	44.73	42.23-45.23	.....	.....	.....
Cleveland	38.50-39.75*	39.00-40.25*	39.50-40.75*	.....	.....	Jersey City	Bethlehem	2.21	42.21	42.71	43.21	43.71	.....
Duluth	39.00	39.50	40.00	40.50	.....	Los Angeles	Provo	7.13	46.13	46.63	.....	.....	.....
Erie	38.50	39.00	39.50	40.00	.....	Mansfield	Cleveland-Toledo	2.56	41.06-42.31*	41.56-42.81*	42.06-43.31*	42.56-43.50	.....
Everett	.....	45.00	45.50	.....	.....	Philadelphia	Bethlehem	2.00	42.00	42.50	43.00	43.50	.....
Granite City	39.50	40.00	40.50	.....	.....	Philadelphia	Swedeland	1.21	46.21	46.71	47.21	47.71	.....
Neville Island	39.00	39.50	39.50	40.00	.....	Philadelphia	Steelton	2.59	42.59	.....	.....	.....	48.59
Provo	39.00	39.50	.....	.....	.....	San Francisco	Provo	7.13	46.13	46.63	.....	.....	.....
Sharpsville	39.00	39.50	39.50	40.00	.....	Seattle	Provo	7.13	46.13	46.63	.....	.....	.....
Steelton	40.00	.....	.....	.....	48.00	St. Louis	Granite City	0.75 Arb.	40.25	40.75	41.25	.....	.....
Struthers, Ohio	39.50	.....	.....	.....	.....				
Swedeland	45.00	45.50	46.00	46.50	.....							
Toledo	38.50	39.00	39.50	40.00	.....							
Troy, N. Y.	.....	.....	.....	.....	48.00								
Youngstown	39.00	39.50	39.50	40.00	.....							

* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 1.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$49.50; f.o.b. Buffalo—\$50.75. Add \$1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$55.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, \$62.46. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk) \$145
Less ton lots (packed) 189.00
Delivered Pittsburgh 151.00

\$1.80 for each 1% above 82% Mn; penalty, \$1.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk ...	8.70	8.95	9.50
Ton lots ...	10.30	10.90	12.80
Less ton lots ...	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn	19-21% Mn
Carloads	3% max. \$46.00	3% max. \$47.00
F.o.b. Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	32
L.c.l. lots	34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	23.00	24.85	26.05
0.10% max. C	22.50	24.35	25.55
0.15% max. C	22.00	23.85	25.05
0.30% max. C	21.50	23.35	24.55
0.50% max. C	21.00	22.85	24.05
0.75% max. C			
7.00% max. Si	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload bulk	7.80
Ton lots	9.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	8.75
Ton lots	10.35
Less ton lots	11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth \$78.00, foundry, \$79.00; \$78.75 f.o.b. Niagara Falls; \$77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	16.90	17.50	18.10
97% Si, 1% Fe	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.50		
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75

65-69% Cr, 4.9% C 18.60 19.00 19.15

62-66% Cr, 4-6% C 18.60 19.00 19.15

Briquets—Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb. chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	97.00	98.50	99.75
0.50% max. C	93.00	94.50	95.75
9.00% min. C	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe

r 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

15-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	\$1.85	\$2.70	\$3.40
Less ton lots	2.20	3.05	4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots	19.25	20.35	22.30

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten; standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed. \$2.25

Ferrovandium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V. \$2.90

Openhearth 3.00

Crucible 3.10

High speed steel (Frimos) \$1.30

Vanadium pentoxide, 88-92% V₂O₅, contract basis, per pound contained V₂ 95¢

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb 80¢

Ton lots \$2.50

Less ton lots \$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo. 80¢

Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo. 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti \$1.25

Less ton lots \$1.25

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti \$1.35

Less ton lots \$1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton \$142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., \$3 unitage per gross ton \$65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. 18.40¢

Carload lots 6.00¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy 6.00¢

Carload, bulk 6.90¢

Ton lots 7.40¢

Alsilfer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y. 9.50¢

Car lots 10.35¢

Ton lots 10.35¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound 9.50¢

Car lots 10.35¢

Ton lots 10.35¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C	\$1.20	\$1.25	\$1.21
Ton lots	\$1.89	\$1.903	\$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots. \$1.80 \$1.8125 \$1.8445

Silicaz, contract basis, f.o.b. plant freight allowed, per pound. \$9.00¢

Carload lots 93¢

No. 1 63¢

No. 6 45¢

No. 79 45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound 50¢

Less ton lots, per pound 50¢

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15-17%, B 0.90-1.15%, Si 2.5-3.0%, Al 1.0-2.0%.

Ton lots, per pound 8.0¢

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B \$6.25

WAA Surplus Property Inventories Sink To \$6.4 Billion Worth

Washington

... Disposal of \$1.4 billion worth of surplus property during the last quarter 1947 has reduced surplus inventories to about \$6.4 billion as of December 31, according to the regular report by War Assets Administration to Congress.

This represents about 84 pct of total declared surplus, WAA reported. Liquidation of personal property, except for aircraft components and parts, is advancing rapidly and disposal of real property is becoming increasingly difficult, the report said.

Disposal of \$378 million worth of war plants during the last quarter brought cumulative disposals to about \$5.1 billion. This leaves a real property inventory as of Jan. 1 of \$3.2 exclusive of plants for which term leases have been negotiated and are regarded as disposals.

In this latter group are 147 industrial plants which are presently under lease to individual operators or companies; another 31 facilities are leased on a multiple tenancy basis to more than 150 individuals or firms. These figures, however, do not include the plants which are under interim lease until such time as the property is sold or leased on a long term basis. Options to buy are included in the terms of at least 68 of the leases.

A major disposal problem still confronting the agency is sale of aircraft components and parts; these amount to roughly \$1 billion, the inventory increasing by nearly \$100 million during the fourth quarter despite sales of \$41.1 million during the 90-day period.

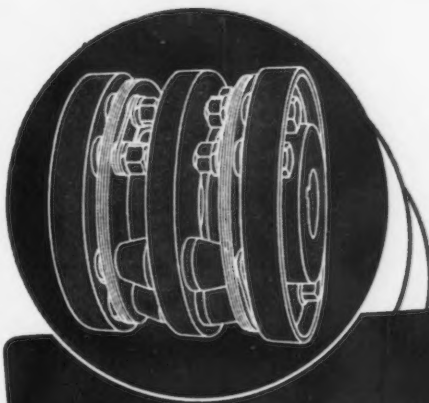
Much of the remaining inventories consist of long-supply and non-standard personal property and hard-to-sell real property, the agency declares. This is reflected in the recovery rates which stood at about 29 pct in the first quarter 1947; this had dropped to 15 pct for the last quarter.

Administrative costs are also on the increase. These rose to 49 pct of realization during the final quarter as compared with the 26 pct average for the year.

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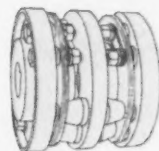
THOMAS

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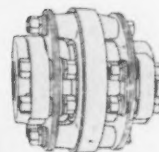
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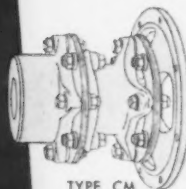
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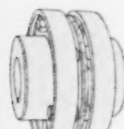
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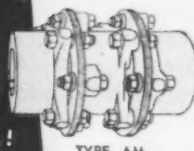
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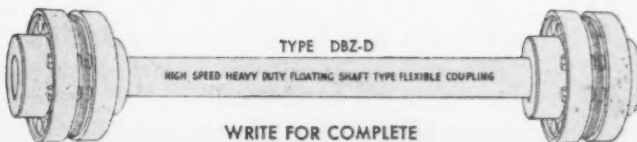
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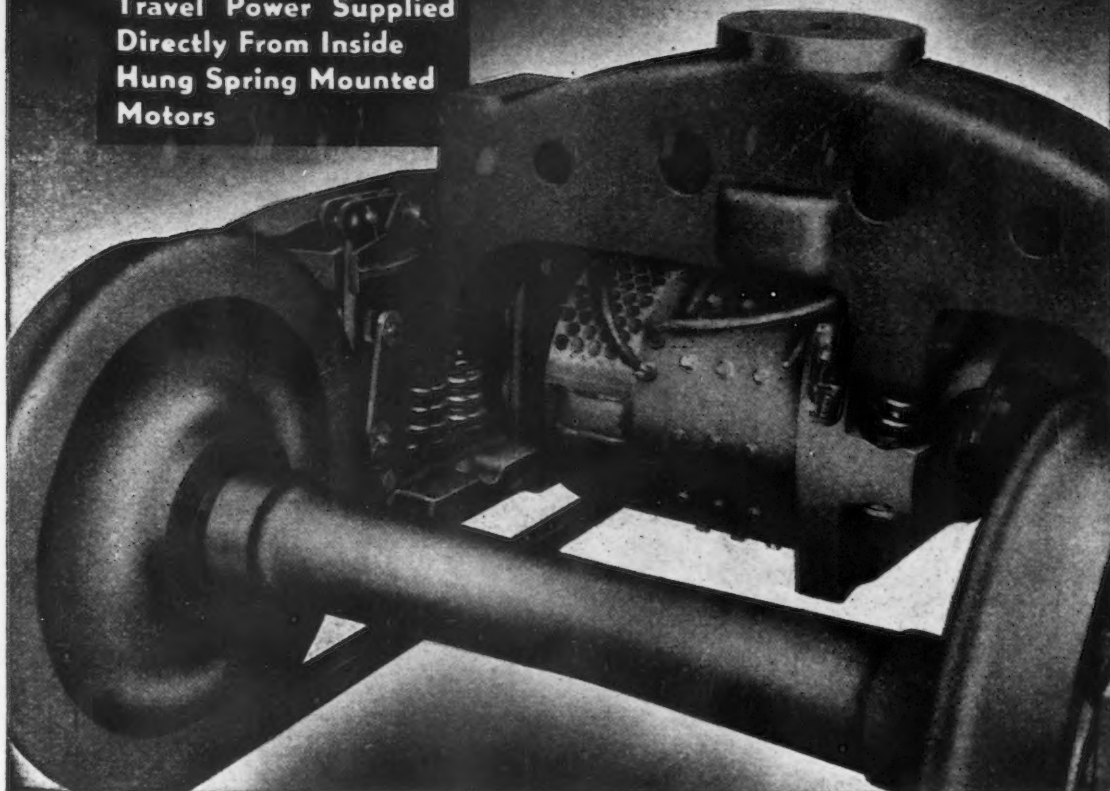
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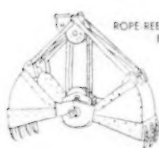
Take a good look at the truck illustrated. It's just *one of the many reasons* why the new Brownhoist Diesel Electric Locomotive-Crane gives you top efficiency in car switching and materials handling at lowest cost. The two electric motors are hung inside the crane trucks, spring suspended from the bolster. Travel power is supplied directly to the axles, eliminating clutches and high maintenance gearing. The result? *Reduced maintenance in heavy travel service.*

And that's typical of the superior design and construction throughout this new Brownhoist crane that *doubles as a powerful, quick-accelerating (up to 15 M.P.H.) switch engine.* Motor current is supplied by generator connected directly to the diesel engine. Power for hoist,

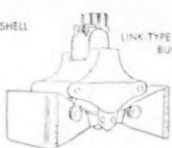
swing and booming is transmitted through a helical gear reducer. Boom hoist is driven by safe-operating worm and wheel. All boom cable is taken on the drum in one lap, hence, no over winding. And of course there's the famous patented Brownhoist Monitor-type cab that provides the operator with 360° visibility and full view of hoist and boom drums for safer, faster crane operation. **Write today for complete facts.**



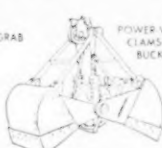
BROWNHOIST BUILDS BETTER CRANES



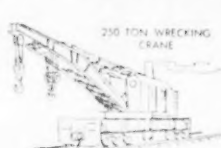
ROPE REEVE CLAMSHELL
BUCKET



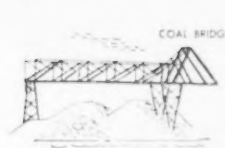
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250 TON WRECKING
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